A photograph of a harbor scene. In the foreground, there is a body of water. In the middle ground, there is a large blue building on the left, a dock with several boats, and a bridge spanning across the water. In the background, there are hills and more buildings. A bright rainbow is visible in the sky on the left side of the image.

# PROTECTED-SPECIES MONITORING AT THE KODIAK FERRY TERMINAL & DOCK IMPROVEMENTS PROJECT, KODIAK, ALASKA, 2015–2016

PROJECT No. 68938/0003109

Prepared for  
**R & M Consultants, Inc.**  
Anchorage, Alaska

and

**Alaska Department of Transportation  
and Public Facilities**  
Juneau, Alaska

Prepared by  
**ABR, Inc.—Environmental Research & Services**  
Fairbanks, Alaska



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AT THE KODIAK FERRY TERMINAL & DOCK IMPROVEMENTS  
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FINAL REPORT

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## EXECUTIVE SUMMARY

- Due to marine mammal activity in the project vicinity, the Alaska Department of Transportation & Public Facilities (DOT&PF) and Federal Highway Administration (FHWA) consulted with the National Marine Fisheries Service (NMFS) to obtain an Incidental Harassment Authorization (IHA) for pile driving and extraction activities in the Near Island Channel. As part of the IHA, protected species observers (PSO) were required to monitor in-water construction activities and document interactions with animals protected under the Marine Mammal Protection Act and the Endangered Species Act.
- We monitored protected species (marine mammals and Steller's Eiders [*Polysticta stelleri*]) within 1,150 m of the project area on 110 days from 10 November 2015 to 16 June 2016; construction activity occurred on 67 monitoring days.
- We recorded 3,587 sightings of sea lions within the study area during observation sessions. Steller sea lions were present during all months but were most abundant from February through April. During construction activities, few sea lions observed in the disturbance zone (2%) exhibited behaviors associated with disturbance (e.g., alert, fleeing, or swimming away from the construction site).
- We recorded behaviors associated with each observation; 31 (1.6%) of 1,917 sightings recorded during pile-driving exhibited a disturbance-associated behavior. However, 5 of those sightings appeared to be reacting directly to marine vessels or killer whales, rather than construction activity.
- We recorded level B take for 4 IHA authorized species: Steller sea lion, harbor seal, harbor porpoise, and killer whale. Total level B take was less than 40% of the authorized limit, and there was no level A take of any species.
- We initiated 65 shutdowns or delays because sea otters approached or entered the shutdown zone. The average shutdown duration was less than 15 min.
- The monitoring and mitigation measures taken during the Kodiak Ferry Terminal and Dock Improvement Project were effective in eliminating all Level A take for all protected species present in the project area.



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## ACRONYMS AND ABBREVIATIONS

AMHS	Alaska Marine Highway System
DOT&PF	Alaska Department of Transportation & Public Facilities
DPS	Distinct Population Segment
DTH	down-hole drilling
ESA	Endangered Species Act of 1973, as amended
FR	Federal Register
h	hour
IHA	Incidental Harassment Authorization
km	kilometer
kt	knot
kph	kilometers per hour
LOC	Letter of Concurrence
NMFS	National Marine Fisheries Service
m	meter
min	minute
MMPA	Marine Mammal Protection Act of 1972, as amended
PSO	Protected species observer
QA/QC	Quality assurance and quality control
USFWS	U.S. Fish and Wildlife Service

## INTRODUCTION

Construction for the Kodiak Ferry Terminal & Dock Improvements Project was initiated in October 2014 to replace Pier 1 in Kodiak, Alaska. This multi-use facility is owned by the City of Kodiak and used by many entities, including the Alaska Marine Highway System. During construction, the old timber dock was replaced with a modern steel and concrete structure. The work required use of pile driving equipment known to generate elevated levels of underwater noise that exceed harassment thresholds established by the National Marine Fisheries Service (NMFS) for marine mammals. All marine mammals are protected under the Marine Mammal Protection Act of 1972, as amended (MMPA; 70 Federal Register [FR] 1871-1875), which prohibits the unauthorized “take” (e.g., disturbance, physical harm, mortality), including disturbance from underwater noise. Additionally, the Endangered Species Act of 1973, as amended (ESA), also prohibits take. Marine mammals and species protected under the ESA are collectively referred to as protected species. A Marine Mammal Monitoring and Mitigation Plan for protected species was developed as part of the application for an Incidental Harassment Authorization (IHA) and in support of formal Section 7 consultation under the ESA (Appendices A, B). Implementation of the plan ensured that the project and contractors minimized and mitigated the harassment of protected species to comply with the MMPA and ESA.

Species protected under the MMPA that occur in the waters near the project area include Steller sea lions (*Eumetopias jubatus*) from the Western Distinct Population Segment (DPS, listed as endangered under the ESA), killer whales (*Orcinus orca*), harbor porpoises (*Phocoena phocoena*), and harbor seals (*Phoca vitulina*). Humpback whales (*Megaptera novaeangliae*), fin whales (*Balenoptera physalus*), gray whales (*Eschrichtius robustus*) and Dall’s porpoises (*Phocoenoides dalli*) occur in waters around Kodiak, although they rarely occur near shore. The presence of protected marine-mammal species required mitigation activity during the proposed period of construction at the Kodiak Ferry Terminal and Dock (30 September 2015–29 September 2016).

ESA-listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) that occur in the waters around Kodiak include Steller’s Eider (*Polysticta stelleri*), listed as threatened in 1997, and the Southwest Alaska DPS of northern sea otters (*Enhydra lutris kenyoni*), which were listed as threatened in 2005. Both of these ESA-protected species required avoidance and minimization measures as identified by the USFWS in a Letter of Concurrence (LOC; 26 June 2013; Appendix C).

The DOT & PF was given authorization under Section 101(a)(5)(D) of the MMPA to harass marine mammals incidental to the Kodiak Ferry Terminal and Dock improvements project as part of an Incidental Harassment Authorization (IHA). The IHA required the DOF&PF to use wildlife observers to monitor disturbance and shutdown zones within 1,150 m of the project area for protected species. The IHA also authorized 2 types of incidental harassment of marine mammals and established authorized numbers of “take” in each category for pinnipeds and cetaceans (Table 1). NMFS defines Level A Harassment (hereafter, Level A take) as having “the potential to injure a marine mammal or marine mammal stock in the wild”; and Level B Harassment (hereafter, Level B take) as having “the potential to disturb a marine mammal or marine mammal stock in the wild by causing a disruption of behavioral patterns.”

The objectives of this monitoring plan were to: (1) notify the DOT&PF on-site representative when they were at risk of taking a protected species; (2) provide documentation of any protected species that were present within the disturbance and shutdown zones from 30 min prior to 30 min after any pile-driving activity that occurred at or below mean high tide; (3) monitor protected species behavior; (4) conduct counts of the local Steller sea lion population on Dog Bay Float to provide indices of occurrence; and (5) document observation conditions and inform DOT&PF when the conditions affected observers’ ability to monitor the entire disturbance and/or shut-down zone. Monitoring occurred at the Pier One work site of the Kodiak Ferry Terminal and followed protocols approved by NMFS in the IHA.

Table 1. Numbers of authorized take, by species, as authorized by the NMFS Incidental Harassment Application and USFWS Section 7 Consultation LOC (26 June, 2013), Kodiak Ferry Terminal and Dock Improvement Project, September 2015–September 2016.

Species/stock	Authorized Shutdown Zone (Level A) takes	Authorized Disturbance Zone (Level B) takes	Total authorized takes
Steller's Eider ( <i>Polysticta stelleri</i> )	0	0	0
Steller sea lion ( <i>Eumetopias jubatus</i> ), wDPS stock	30	3,260	3,290
Harbor seal ( <i>Phoca vitulina richardii</i> ), South Kodiak stock	0	40	40
Northern sea otter ( <i>Enhydra lutris kenyoni</i> ), Alaska DPS	0	0	0
Killer whale ( <i>Orcinus orca</i> ) Eastern N Pacific, Gulf of Alaska, Aleutian Islands and Bering Sea Transient stock	0	48	48
Harbor porpoise ( <i>Phocoena phocoena</i> ) Gulf of Alaska stock	0	40	40
All other marine mammal species	0	0	0

#### IHA AND ESA MITIGATION MEASURES

The IHA issued by NMFS on 30 September 2015 for construction activities associated with the Kodiak Ferry Terminal and Dock Improvement Project required DOT&PF to adopt the following mitigation measures:

- Implementation of shutdown zones (Table 2) during pile-driving activities for all marine-mammal species. Additionally, the LOC from the USFWS applied shut-down requirements for Steller's Eiders and northern sea otters.
- Avoidance of direct interaction with marine mammals during in-water heavy machinery work other than pile-driving that may occur in association with the specified activities. If a marine mammal approached within 10 m of such activity, operations ceased and vessels reduced speed to the minimal level required to maintain steerage and safe working conditions, as appropriate.
- Establishment of monitoring locations (Figure 1) and adherence to the Marine Mammal Monitoring and Mitigation Plan (HDR 2015).
- Stationing a minimum of 1 trained observer at or near the Pier One work site to monitor the shutdown zones and a minimum of 1 trained observer on Near Island to monitor the project area and surrounding waters. Trained observers were located at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures through communication with the equipment operator, if required (Figure 1).

Table 2. Minimal radial distances for disturbance and shutdown zones as specified in the NMFS IHA and USFWS Section 7 Consultation Letter of Concurrence (26 June, 2013) for the Kodiak Ferry Terminal and Dock improvement project, September 2015–September 2016.

Species	Activity					
	Down-Hole Drilling		Vibratory Drilling/Extraction		Impact Driving	
	Shutdown Zone	Disturbance Zone	Shutdown Zone	Disturbance Zone	Shutdown Zone	Disturbance Zone
Steller's Eider ( <i>Polysticta stelleri</i> )	n/a	n/a	100	100	300	300
Steller Sea Lion ( <i>Eumetopias jubatus</i> ), wDPS stock	n/a	300	n/a	1,150	4	350
Harbor Seal ( <i>Phoca vitulina richardii</i> ), South Kodiak stock	n/a	300	n/a	1,150	4	350
Northern Sea Otter ( <i>Enhydra lutris kenyoni</i> ), Alaska DPS	n/a	n/a	100	100	300	300
Killer Whale ( <i>Orcinus orca</i> ) Eastern N Pacific, Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock	n/a	300	n/a	1,150	20	350
Harbor Porpoise ( <i>Phocoena phocoena</i> ) Gulf of Alaska stock	n/a	300	n/a	1,150	20	350
All other marine mammal species	300	300	1,150	1,150	350	350

- Cessation of impact-pile installation when observers were unable to make observations within the shutdown zone due to poor environmental conditions (e.g., sea state, weather); activities resumed when conditions allowed for observations.
- Monitoring from 30 min prior to the initiation of pile-driving activity until 30 min after it was completed.
- Cessation of pile-driving activities if a marine mammal (other than a Steller sea lion) approached or entered the shutdown zone. Activity did not commence or resume until the animal voluntarily left the shutdown zone and its departure was confirmed visually, or after 15 min (for small odontocetes, pinnipeds, and sea otters) or 30 min (for medium-sized whales, including killer whales), had passed without redetection of the animal.

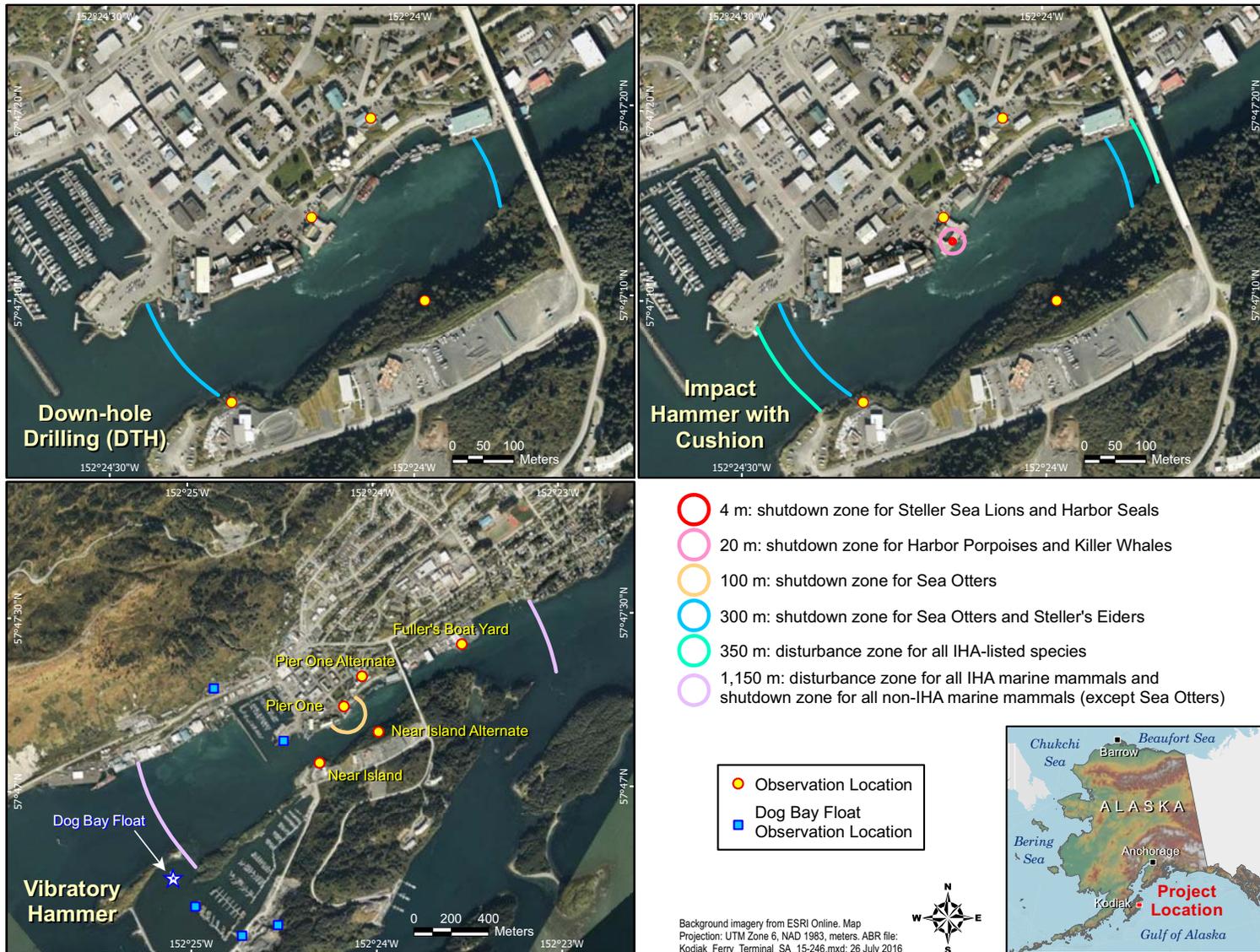


Figure 1. Study area map showing disturbance- and shutdown-zone boundaries, the Dog Bay float, and observation locations for protected-species monitoring and float counts.

- Use of soft-start techniques recommended by NMFS for vibratory and impact pile-driving. A soft start for vibratory drivers required contractors to initiate sound for 15 s at reduced energy, followed by a 1-min waiting period; this procedure was repeated 2 additional times. A soft start for impact drivers required contractors to provide an initial set of strikes at reduced energy, followed by a 1-min waiting period, then 2 subsequent reduced-energy strike sets. Soft start procedures for vibratory and impact pile-drivers were implemented at the start of each day's pile driving and at any time following the cessation of pile driving for a period of 30 min or longer.
- Use of pile cushions during all impact pile-driving activities.
- Operation for up to a maximum of 10 h per day for all in-water pile-driving activities.

### STUDY AREA

The Kodiak Ferry Terminal and Dock at Pier One is located in Kodiak, Alaska, on the northeastern side of Kodiak Island. The dock is situated in Near Island Channel (Figure 1), which runs between the city of Kodiak and Near Island, and is flanked by a seafood-processing dock to the west and a marine fuel-service floating dock to the east. The IHA-defined disturbance zones for each activity type (impact driving, vibratory driving, and down-hole drilling [DTH]) and shutdown zones were defined for pinnipeds and cetaceans (Table 2). Five monitoring locations were used during this study—the preferred one at the Ferry Terminal work site (“Pier One”); an alternate site at DOT&PF’s office (“Pier One Alternate”) that was used when construction activities rendered the Pier One monitoring site unsafe; one at Fuller’s Boat Yard located east of Pier One; and 2 on Near Island (“Near Island” and “Near Island Alternate” (Figure 1). Fuller’s Boat Yard is an active boat yard with changing conditions. When conditions at Fuller’s Boat Yard were unsafe or had limited visibility, we used the Pier One or Pier One alternate site. During impact-driving and DTH, we stationed one observer at Pier One or its alternate and one

observer at Near Island or its alternative, thereby allowing the monitoring of both shutdown and disturbance zones and surrounding waters (Appendix D). During vibratory impact-driving, we stationed one observer at Fuller’s Boat Yard or Pier One alternative and one observer at Near Island to monitor disturbance and shutdown zones.

### SHUTDOWN AND DISTURBANCE ZONES

Disturbance and shutdown zones for each type of construction activity were established according to guidelines set out in the IHA and USFWS LOC (Figure 1).

## METHODS

### OBSERVER TRAINING

Prior to beginning the monitoring program, all observers attended a 1-day training session in Kodiak. During the training, observers reviewed field characteristics of marine mammals with marine mammal biologist Kate Wynne, author of *The Guide to Marine Mammals of Alaska*. They also practiced distance estimation with the aid of range-finders and reticle binoculars. All observers practiced entering data on tablets and paper, proofing data after the observation session, and communicating between observers during sessions. All observers exceeded the minimal qualifications required by NMFS for marine-mammal observers ([http://www.westcoast.fisheries.noaa.gov/protected\\_species/marine\\_mammals/monitoring\\_plan\\_guidance.html](http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/monitoring_plan_guidance.html)) and as outlined in the IHA.

### PROTECTED-SPECIES MONITORING

During all pile-driving activities associated with the Kodiak Ferry Terminal and Dock improvements project, we monitored the construction site, shutdown and disturbance zones, and surrounding waters for marine mammals and Steller’s Eiders before, during, and after construction activities. The PSO team met with DOT&PF and the construction crew each morning to review safety, the construction plan for the day, the communication protocol, and shutdown procedures. Observers began monitoring 30 min prior to scheduled construction activities and continued until 30 min after construction activity had ceased. In addition, on days without pile-driving activity, we conducted a minimum of 1 h of observations if it was feasible (i.e., observers

were still in Kodiak) to help establish a baseline of protected-species activity in the area.

We scanned the water in each monitoring zone by using the naked eye, binoculars, and spotting scopes. All observations of protected species were recorded on Android tables or on paper. If a marine mammal listed in the IHA entered the disturbance zone, we mapped its location and recorded a unique ID code, date and time of the observation, species, number of individuals, age, sex, direction of travel, distance among individuals within a group, and behavior (Appendix E). We recorded whether pile-driving activities were occurring at the time of the observation, any other possible causes of disturbance behaviors (if observed), and shut down details, if applicable. Records of animals exhibiting one or more disturbance behaviors were flagged as possible reactions to construction activities and were reviewed by the field team leader in consultation with the observer.

When an animal or group of animals was in the shutdown or disturbance zones, we recorded an observation of the individual or group every 5 min, when the animal entered/left a zone, and/or when the animal changed behavior. If any moving marine vessels were present in the area when a marine mammal was present, we recorded the vessel's location, type, and activity and whether or not the any animals responded to the vessel.

Observers maintained radio communication with construction staff at all times as outlined in the communication protocols for this project (Appendix F) to avoid unnecessary take of protected species. If an individual or group of protected species was approaching the shutdown zone, we contacted a DOT&PF representative immediately to inform them of a potential shutdown. If an individual or group of protected species was observed in the shutdown zone, a shutdown was initiated immediately. We continued to monitor the animal or group of animals until it had left the shutdown zone; once the zone was clear, we notified the DOT&PF representative and recorded the time that construction activities resumed. If a marine mammal for which take was not authorized (e.g. humpback, gray, or fin whale, Dall's porpoise) approached the shutdown zones, we notified the DOT & PF representative immediately to inform them of the need for a

shutdown. We documented all communication regarding potential and required shutdowns and maintained a log of activity that included the time we contacted the crew, how we contacted the crew, when the activity stopped, and when it resumed. If a shutdown was requested but construction activity did not resume for the day (e.g., the crew quit for the day, moved on to a different task, or went to lunch), we calculated the shutdown duration as the difference between the time when the shutdown was initiated and when the construction crew notified observers they would not be resuming pile-driving.

#### DOG BAY FLOAT SURVEYS AND INCIDENTAL OBSERVATIONS

We conducted a biweekly census of Steller sea lions at Dog Bay Float, a human-made haul-out located ~1,300 m from the project site (Figure 1), to obtain an index of the presence and abundance of Steller sea lions in the Near Island Channel. Dog Bay Float is an old section of floating breakwater that was relocated to Dog Bay in 2000 to serve as a dedicated sea lion haul-out and to reduce human-sea lion conflicts around Kodiak's docks and harbors (NMFS 2015). Two to four times a week, we counted the number of sea lions hauled out on the float 3–4 times a day (depending on day length). We used multiple counts per day to obtain a maximal count for each day. Our survey location depended on weather and visibility and on the number of sea lions hauled out on the float. Our preferred observation locations were on Near Island Hill 650 m from the float or on the mainland 1,000 m from the float; however, if there were few (<25) sea lions hauled out or if visibility was limited due to daylight or weather conditions, we observed from a lower-elevation location on Near Island 550 m from the float or from the waterfront on the mainland 930 m from the float (Figure 1). Both of the preferred observation locations offered the best vertical vantage point for looking down onto the float and seeing all individuals present (Appendix D). If conditions allowed, the observer photographed the haul-out and compared photo counts with estimates made in the field; if photo quality was good enough to distinguish individuals clearly, we used the photo counts, rather than visual estimates, in data summaries.

## DATA COLLECTION AND ANALYSIS

We collected all data using ArcGIS Collector (Esri, Redmond, CA) on Android tablets; all data were uploaded to a PostgreSQL database. We submitted weekly and monthly reports summarizing new and cumulative take numbers, observation conditions, shutdowns, and types of construction activity. These interim reports were based on preliminary data that had not been subjected to multiple levels of data QA/QC. Consequently, the results and information presented here supersede all previous reports.

We define 5 periods of activity when presenting our data. Pre-construction observations were made before any construction activity had begun for the day. Pre-/post-construction observations were those made between periods of construction activity (i.e., between 2 sessions of pile driving); the duration of these periods ranged from several minutes to several hours. Post-construction observations were those made after all construction activity had ceased for the day. Any observations made while pile driving was underway were considered to be “during construction” observations. Non-construction observations refer to those made on days without any pile driving.

## RESULTS AND DISCUSSION

### MONITORING EFFORT AND CONSTRUCTION ACTIVITY

We monitored protected-species activity in the Near Island Channel on 110 days between 10 November 2015 and 16 June 2016 (Appendix G). During that time, we recorded data during 67 days of in-water pile-driving activities. Construction activities included 9.5 h over 30 days of impact-driving, 63.8 h over 60 days of vibratory-driving, and 91.3 h over 32 days of down-hole drilling (Table 3).

### OBSERVATION CONDITIONS

Observation conditions generally were good during the construction season, with most observation periods having calm seas (Figure 2), no precipitation (Figure 3), and calm winds (Figure 4). Wind speeds ranged 0–26 kt and generally were from the northwest. The Near Island Channel is a protected waterway where the sea state typically was below Beaufort 2 with only small wavelets or

ripples. Winds were heaviest in February, leading to the use of an alternative observation site on Near Island on 27 February.

Visibility in the study area was affected by available daylight and precipitation conditions; the periods of adequate visibility for surveys varied considerably throughout the construction season. Periods between civil twilight (i.e., meeting minimal requirements for available daylight) ranged from 8.25 h in late December to 20.5 h in June (Appendix H). Construction was delayed or shut down on 3 occasions due to precipitation-induced reduced visibility. On 4 March, construction was delayed because heavy rain reduced visibility to 0.8 km; on 19 March, a shutdown was initiated because snow reduced visibility to 0.8 km; and on 31 March, a shutdown was initiated because heavy rain reduced visibility to 0.6 km.

The Near Island channel contains several floating tie-up areas and a fishery unloading area; consequently, we had at least some boat traffic during most of our observations (Figure 5). Boat traffic was heaviest in June and lowest in mid-November and mid-December. Steller sea lions frequently followed boats or attempted to climb onto boats; interactions that elicited a disturbance behavior are described below.

### PROTECTED-SPECIES MONITORING

During PSO monitoring, we recorded 8 protected species using the waters near the Kodiak Ferry Terminal and Dock improvement project (Table 4). These included the 4 species covered by the IHA (Steller sea lion, harbor seal, killer whale, and harbor porpoise), 1 humpback whale seen transiting through the channel on 15 March between bouts of down-hole drilling, and a group of 2 river otters seen jumping off the breakwater on the west end of the channel on 25 May, between bouts of vibratory hammer activity. In addition, we recorded Steller’s Eiders in January and a large number of sea otters (both of which were addressed in the USFWS LOC). Between November and June, we recorded 5,111 Steller sea lions, 4,127 sea otters, 13 harbor seals, 19 killer whales, 6 harbor porpoise, 1 humpback whale, 2 river otters, and 8 Steller’s Eiders and within the study area, during 519 hours of observation.

Table 3. Daily monitoring effort, weather, and sea conditions, Kodiak Ferry Terminal and Dock improvement project, Kodiak, AK, November 2015–June 2016.

Day	Times			Duration (minutes)		
	Vibratory	Impact	Down-hole	Vibratory	Impact	Down-hole
11/14/2015	10:59 to 11:15; 11:25 to 12:04; 10:32 to 10:44; 13:44 to 14:39; 13:12 to 13:15; 08:48 to 09:08; 09:24 to 09:44	0	0	166	0	0
11/17/2015	10:16 to 10:32; 09:45 to 09:55	0	0	25	0	0
12/4/2015	0	0	0	0	0	0
12/5/2015	0	0	0	0	0	0
12/14/2015	13:52 to 14:18; 12:02 to 12:19	0	0	44	0	0
12/15/2015	09:20 to 11:40	0	14:50 to 17:01	140	0	131
12/16/2015	0	0	10:15 to 10:30; 09:45 to 09:51	0	0	21
12/17/2015	0	16:20 to 16:45	12:55 to 14:54; 10:30 to 11:52	0	25	202
12/19/2015	12:07 to 12:10; 09:33 to 10:31; 10:31 to 12:05	0	0	155	0	0
1/5/2016	0	0	15:30 to 16:51; 10:27 to 11:21; 11:32 to 15:07	0	0	350
1/6/2016	0	12:51 to 13:02; 13:45 to 13:56	0	0	22	0
1/9/2016	10:13 to 10:20; 09:58 to 10:05	0	0	15	0	0
1/13/2016	11:42 to 12:12	0	0	30	0	0
1/18/2016	15:10 to 15:18; 15:26 to 15:29; 15:34 to 15:38; 14:14 to 14:21; 15:43 to 15:52; 14:44 to 15:02	0	0	50	0	0
1/19/2016	16:54 to 17:10	0	0	17	0	0
1/20/2016	10:12 to 10:18; 14:44 to 15:20	0	0	42	0	0
1/22/2016	16:28 to 16:37; 14:32 to 14:37	14:50 to 15:25; 16:15 to 16:18	11:03 to 12:20	14	38	76
1/23/2016	13:54 to 14:20; 11:10 to 11:30	12:24 to 12:37; 12:01 to 12:13; 11:45 to 11:51	0	47	30	0
1/25/2016	11:08 to 11:22; 09:53 to 11:03	0	13:01 to 13:48; 16:32 to 17:22; 14:34 to 15:53	84	0	177

Table 3. Continued.

Day	Times			Duration (minutes)		
	Vibratory	Impact	Down-hole	Vibratory	Impact	Down-hole
1/26/2016	09:40 to 09:43; 16:34 to 16:45; 16:00 to 16:19; 13:12 to 13:42	13:47 to 14:08	10:48 to 11:52	64	21	65
1/27/2016	15:29 to 15:31; 15:44 to 16:34	10:58 to 11:01	0	52	3	0
1/28/2016	17:05 to 17:14; 17:20 to 17:28; 16:52 to 17:00	0	09:29 to 11:43; 14:37 to 16:22	26	0	238
1/29/2016	15:46 to 16:33	17:00 to 17:11	09:36 to 10:37; 11:56 to 14:57	48	11	243
1/30/2016	11:36 to 11:42; 09:28 to 09:34; 16:15 to 16:16	16:28 to 16:30	14:20 to 15:37	13	2	77
2/1/2016	11:28 to 11:45; 11:14 to 11:21	0	0	24	0	0
2/11/2016	15:57 to 16:42	0	0	46	0	0
2/12/2016	12:52 to 12:59; 13:53 to 14:03; 13:17 to 13:40; 11:13 to 11:52	0	0	80	0	0
2/18/2016	12:47 to 14:10	0	0	83	0	0
2/19/2016	09:58 to 12:30; 08:47 to 10:03; 12:47 to 14:50	0	0	352	0	0
2/21/2016	0	0	10:29 to 11:12; 11:55 to 12:38	0	0	86
2/23/2016	11:59 to 12:07; 11:36 to 11:54	0	0	25	0	0
2/24/2016	11:18 to 11:52	0	15:47 to 17:43; 13:01 to 15:15	35	0	251
2/25/2016	09:23 to 09:47; 11:59 to 12:00; 16:36 to 17:28; 09:10 to 09:19; 09:54 to 10:31; 10:37 to 10:41	13:10 to 13:35	0	129	25	0
2/26/2016	09:30 to 10:27; 09:12 to 09:26	0	15:56 to 16:37; 17:10 to 18:24; 15:32 to 16:36; 13:30 to 14:48; 12:31 to 13:20; 11:36 to 12:10	71	0	339
2/27/2016	11:29 to 11:40; 15:44 to 16:13; 15:26 to 15:38; 16:24 to 16:31; 09:51 to 10:01; 10:01 to 11:17; 10:39 to 11:17	13:26 to 13:32; 13:00 to 13:06	0	184	12	0

Table 3. Continued.

Day	Times			Duration (minutes)		
	Vibratory	Impact	Down-hole	Vibratory	Impact	Down-hole
2/28/2016	10:24 to 11:00; 14:46 to 15:28	0	0	78	0	0
2/29/2016	0	0	11:30 to 12:55; 08:46 to 09:25; 13:41 to 14:23; 09:40 to 10:05; 15:13 to 16:20; 13:04 to 13:30	0	0	285
3/1/2016	08:56 to 09:06; 15:21 to 16:20; 09:14 to 09:58; 14:25 to 15:17	10:55 to 11:01; 10:27 to 10:33; 10:41 to 10:46	0	164	16	0
3/2/2016	0	0	14:45 to 15:45; 16:14 to 16:26; 09:04 to 13:32	0	0	340
3/3/2016	17:00 to 17:06; 17:12 to 17:14	0	0	8	0	0
3/4/2016	14:30 to 14:54; 17:48 to 18:18; 17:11 to 17:29	15:07 to 15:23	13:07 to 13:55; 11:23 to 12:15; 12:33 to 13:03; 09:29 to 10:15; 10:32 to 11:06	73	16	210
3/5/2016	08:43 to 09:16; 09:20 to 09:33	0	12:43 to 15:19; 15:45 to 16:39; 10:38 to 11:44	47	0	275
3/6/2016	10:33 to 10:37; 08:50 to 09:45; 16:57 to 17:19; 08:10 to 08:23; 15:39 to 16:15; 08:39 to 08:42	11:23 to 11:33	0	134	10	0
3/7/2016	13:24 to 14:00; 16:43 to 16:47; 14:03 to 15:01	17:00 to 17:13	08:57 to 09:20; 15:55 to 16:17; 12:26 to 13:04; 11:05 to 11:42; 09:49 to 10:29	97	13	161
3/8/2016	16:01 to 16:10; 16:25 to 16:31; 09:07 to 09:10	0	0	19	0	0
3/9/2016	07:54 to 08:05	11:49 to 12:27	08:30 to 09:46; 10:46 to 11:49	11	38	139
3/12/2016	07:58 to 08:42	14:29 to 14:33	0	44	4	0
3/14/2016	17:26 to 18:05; 16:53 to 17:06; 13:01 to 13:38	0	0	89	0	0
3/15/2016	16:26 to 16:39	16:54 to 17:03	10:06 to 10:30; 11:58 to 12:40; 13:29 to 14:10; 11:17 to 11:46; 14:55 to 16:02	13	9	204

Table 3. Continued.

Day	Times			Duration (minutes)		
	Vibratory	Impact	Down-hole	Vibratory	Impact	Down-hole
3/16/2016	10:22 to 11:18	0	13:54 to 14:59; 12:17 to 13:09; 15:51 to 17:26	56	0	211
3/17/2016	15:21 to 16:11	16:55 to 17:11	09:39 to 10:34	51	17	56
3/18/2016	11:08 to 12:01; 10:12 to 10:18	0	14:44 to 15:49; 13:26 to 14:04; 16:29 to 17:41; 18:20 to 19:06	60	0	220
3/19/2016	12:20 to 12:31; 12:36 to 13:39; 08:38 to 09:29; 09:46 to 09:48	10:02 to 10:18	0	126	15	0
3/21/2016	14:48 to 15:41	15:53 to 16:01; 16:27 to 16:44	13:31 to 14:26; 12:01 to 12:58; 09:02 to 09:52; 10:40 to 11:16	53	25	199
3/22/2016	10:29 to 10:43; 13:16 to 13:20; 15:00 to 15:52	13:30 to 13:30	11:57 to 12:47	37	0	50
3/30/2016	17:19 to 17:30	0	16:23 to 16:49	11	0	27
3/31/2016	15:42 to 15:45; 11:45 to 11:57; 15:16 to 15:21; 16:35 to 16:53; 08:28 to 08:55	09:39 to 09:45; 09:25 to 09:29	0	65	10	0
4/1/2016	13:44 to 14:08; 08:09 to 08:18	14:17 to 14:24	10:06 to 10:42; 11:01 to 11:33; 11:52 to 13:04	33	7	141
4/12/2016	10:54 to 11:34; 16:28 to 16:50	0	0	63	0	0
4/13/2016	16:51 to 16:55; 16:40 to 16:55; 13:24 to 13:35	13:43 to 14:20	10:10 to 10:45; 11:17 to 12:01; 09:04 to 09:41	29	37	117
4/14/2016	16:04 to 16:29; 13:40 to 14:04; 16:27 to 16:28	14:34 to 14:57	11:43 to 12:02; 10:36 to 11:15; 12:02 to 13:14; 09:16 to 09:53	50	23	168
4/15/2016	10:00 to 10:17; 13:20 to 13:43	0	14:47 to 16:08; 16:46 to 17:33	40	0	128
4/16/2016	11:48 to 12:04; 12:57 to 13:04; 15:52 to 16:25	13:09 to 13:31	09:27 to 09:58; 10:38 to 11:24	56	21	77
4/18/2016	14:44 to 15:02	15:10 to 15:30	08:26 to 09:39; 13:20 to 14:09; 10:33 to 11:35; 12:07 to 12:35	18	21	212
5/24/2016	16:49 to 16:52; 17:02 to 17:42; 16:25 to 16:28	0	0	48	0	0

Table 3. Continued.

Day	Times			Duration (minutes)		
	Vibratory	Impact	Down-hole	Vibratory	Impact	Down-hole
5/25/2016	11:35 to 11:44; 10:29 to 11:35; 10:10 to 10:30	0	0	95	0	0
6/14/2016	08:18 to 08:20; 08:11 to 08:14; 08:32 to 08:34	12:53 to 13:11; 13:21 to 13:25	0	7	24	0
6/15/2016	11:21 to 11:23; 09:44 to 10:04; 21:44 to 21:56; 13:26 to 13:49; 11:15 to 11:22	14:19 to 14:21; 14:25 to 14:35; 13:49 to 14:24	0	64	49	0
6/16/2016	16:10 to 16:35	17:01 to 17:23	0	25	22	0
Total				63.8 hrs	9.5 hrs	91.3 hrs

### Steller sea lions

We recorded 3,587 sightings of sea lions within the study area during observation sessions. Steller sea lions were present during all months but were most abundant from February through April (Figure 6). There was no difference in the time of day of peak abundance throughout the study period (Figure 7). We observed individuals of all age classes (adults, sub-adults, and juveniles) in all months. Nearly all (98%) individuals displayed non-disturbance behaviors, regardless of the construction activity. The behaviors observed most frequently were traveling through the channel and milling about (Figure 8). We recorded 63 sightings of disturbance behaviors: 32 sightings occurred during non-construction periods (before, after, between, non-construction days); and 31 sightings involving 55 individuals occurred during pile-driving. Only 27 of the groups were within the disturbance zone when a disturbance-associated behavior was observed (see details below).

Sea lions were observed within 100 m of the construction site during all phases of construction and non-construction activity (Figures 9–11). The closest distance a sea lion came to the construction site was ~6 m, and this event occurred prior to the start of construction for the day. Only 30 out of the 5,128 sea lions we observed came within 20 m

of the construction site. A total of 2 sea lions approached within 20 m of the construction site during vibratory-hammer activity, but no sea lions were observed within the shutdown zone during any construction activity.

We conducted 2–4 counts per day 2–4 times per week of sea lions that were hauled out on Dog Bay float, for a total of 153 counts over 46 days throughout the construction period. For most surveys, we used counts obtained from photographs; however, we had to use visual counts for 6 surveys because of poor photo quality due to weather conditions. Counts were lowest in late fall and winter, with the lowest daily maximal count occurring on 19 December, when a maximum of 6 individuals were observed on the float. Counts were highest in the spring, with the highest count (114 animals) recorded on 17 April (Figure 12). The increase in animals at Dog Bay Float in the spring may have coincided with the weaning of young from nearby rookeries (Raum-Suryan and Rehberg 2004); however, we were not able to collect accurate data on the ages and sexes of individual sea lions because animals were often only partially visible due to crowding on the float. Maximal weekly counts were correlated only loosely with weekly average-hourly rates of sea lion observations within the construction area (Figure 13).

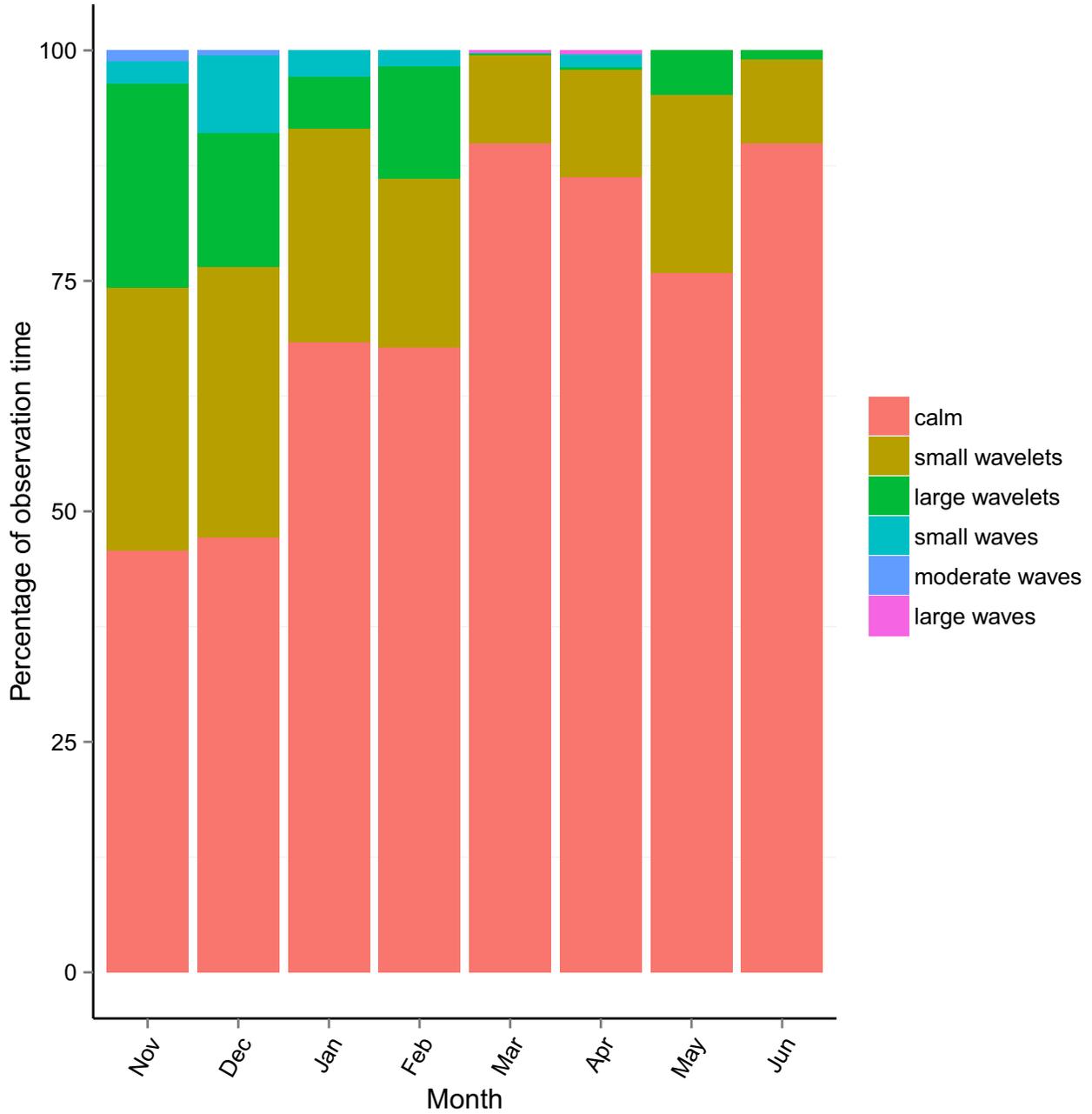


Figure 2. The proportion of observation sessions in each wave-height category during each month of the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.

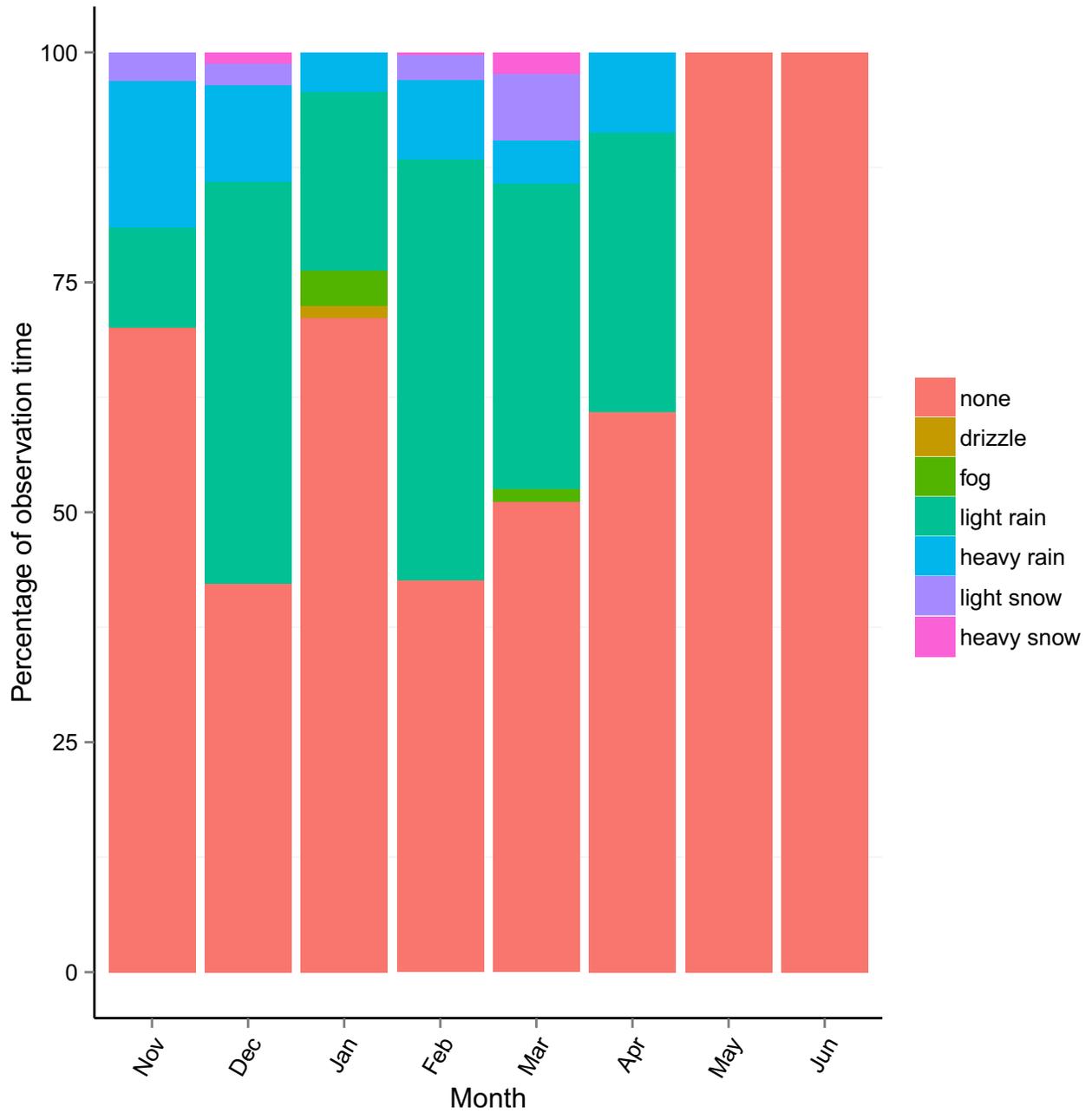


Figure 3. The proportion of observation sessions in each precipitation category during each month of the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.

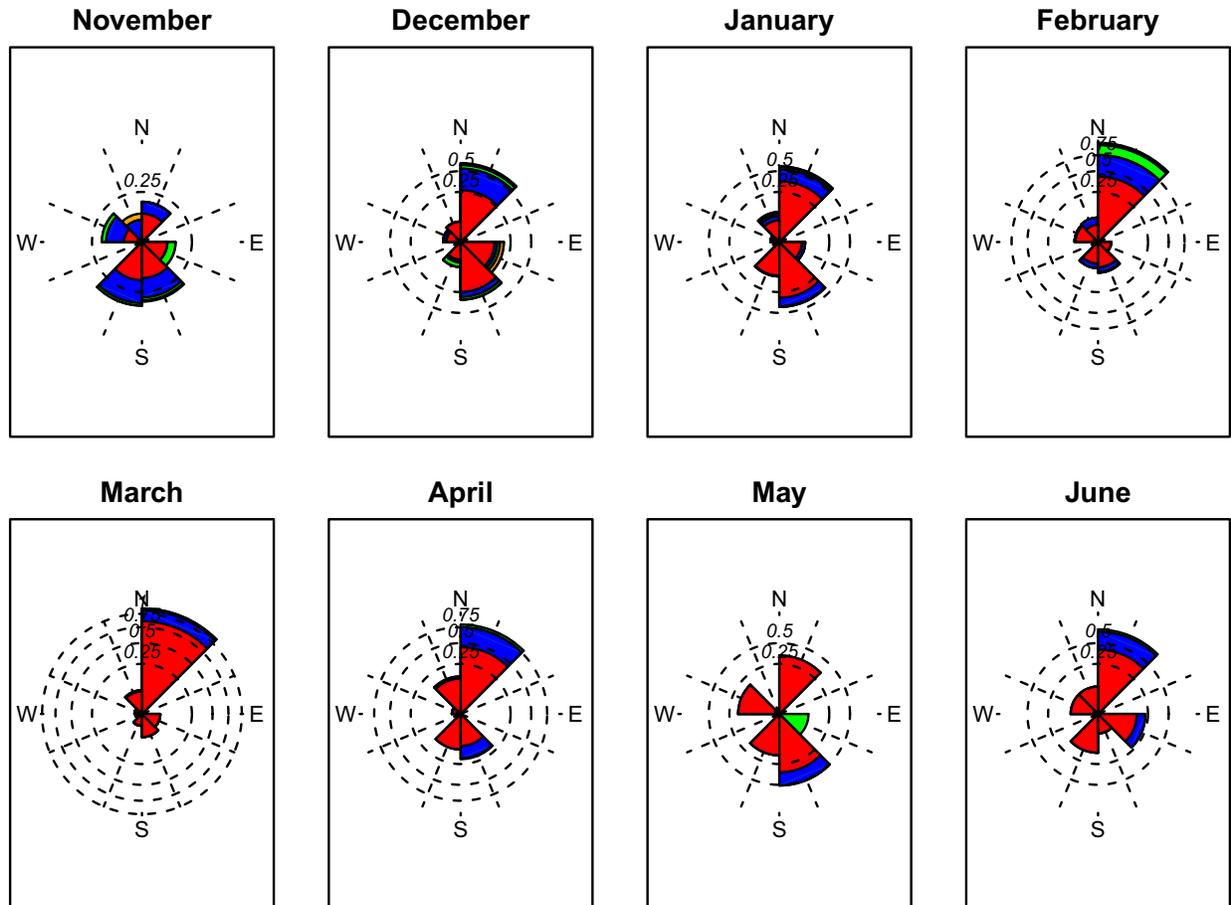


Figure 4. The proportion of observations within each wind direction and velocity category during each month of the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016. Red = <5 kt; blue = 5.1–10.0 kt; green = >10 kt.

#### Sea otters

We recorded 2,880 sightings totaling 4,131 sea otters within the study area during observation sessions. Sea otters were present during all months but were most abundant in December and January (Figure 14). We observed both adults and juveniles in all months. Most individuals displayed non-disturbance behaviors, regardless of the construction activity. The behavior most frequently observed was traveling through the channel, followed by feeding, resting, milling, and diving (Figure 15). We recorded 51 sightings of disturbance behaviors: 38 sightings occurred on construction days (e.g., before, after, pre-/post) and 13 occurred on non-construction days. Sea otters were observed within 100 m of the construction site during non-pile-driving periods and during

down-hole drilling (Figures 16–18). Shutdowns were initiated when sea otters approached within 100 m during vibratory-hammer activities and 300 m during impact pile-driving; hence, the closest approach to the construction site during these activities is constrained to observations beyond these radial distances.

#### Other marine mammals

A total of 13 harbor seal were seen from December through May, and all of the observations were of single individuals. Only 3 harbor seals occurred within the disturbance zone during pile-driving activities, and none of them displayed disturbance behaviors during construction activity. We did observe 3 harbor seals display alert behaviors after construction activities or on a

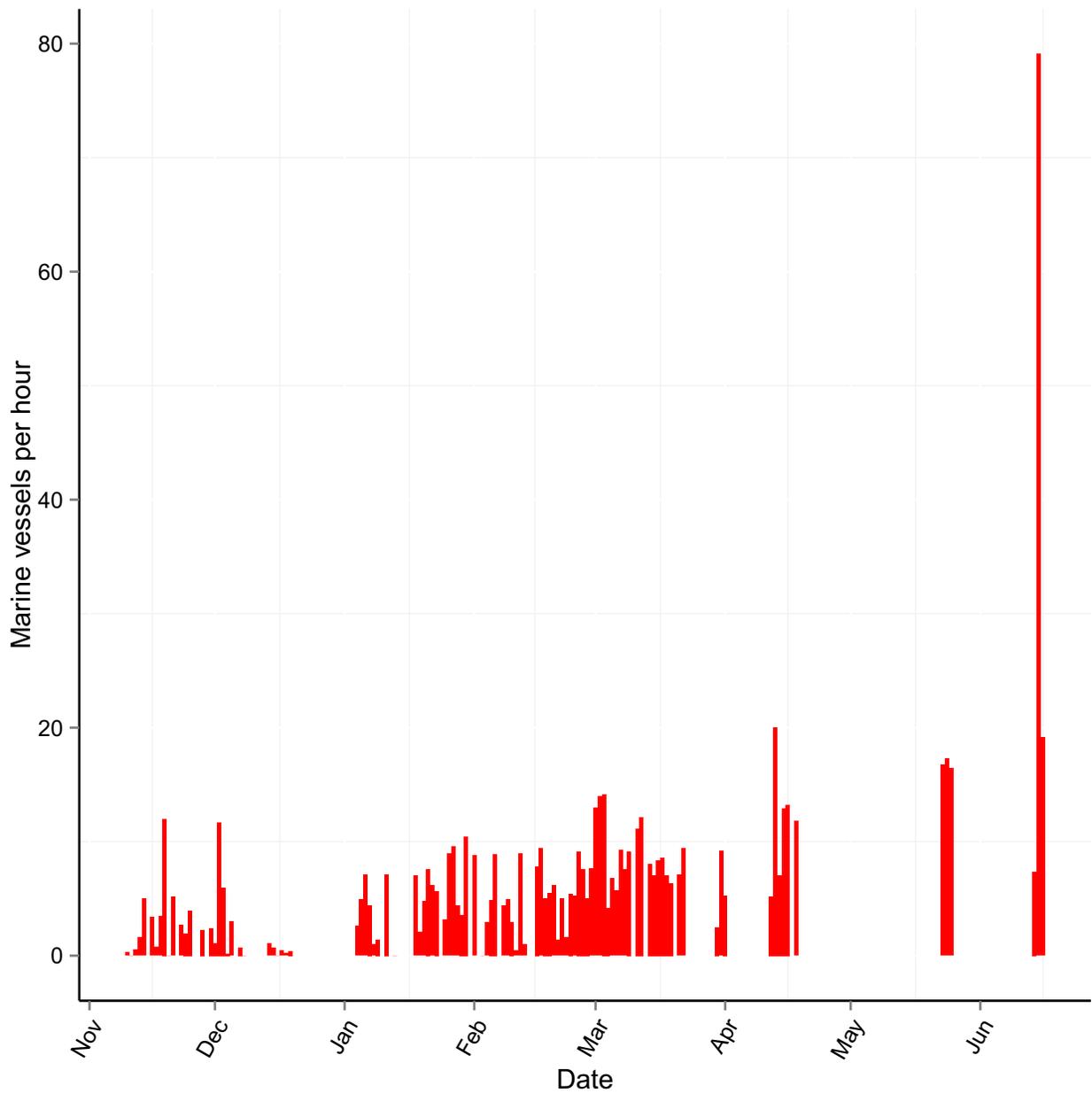


Figure 5. Average hourly number of marine vessels recorded in the disturbance area during each day of observations.

Table 4. Species observed in the vicinity of the Kodiak Ferry Terminal and Dock Improvement Project, Kodiak, AK, November 2015–June 2016.

Common Name	Scientific Name	Number	Species of conservation concern? <sup>a</sup>
Steller Sea Lion	<i>Eumetopias jubatus</i>	5,111	Yes
Harbor Seal	<i>Phoca vitulina</i>	13	Yes
Killer Whale	<i>Orcinus orca</i>	19	No
River Otter	<i>Lontra canadensis</i>	2	No
Humpback Whale	<i>Megaptera novaeangliae</i>	1	Yes
Harbor Porpoise	<i>Phocoena phocoena</i>	6	No
Steller's Eider	<i>Polysticta stelleri</i>	8	Yes
Sea Otter	<i>Enhydra lutris</i>	4,127	Yes

<sup>a</sup> Includes species listed as sensitive, threatened, or endangered by one or more of the following: ADF&G, NMFS, or USFWS

non-construction day, and one harbor seal fled from an area to avoid an interaction with a motorboat unrelated to construction activity. Harbor seals approached within 100 m of the construction site on only 2 occasions, both during non-construction periods (Figures 19–21).

We observed killer whales on 2, 17, and 18 March (Figure 20) and on 24 May (Figure 21). On 2 March, a pod of 2 adults and 2 calves passed through the channel between pile-driving activities and remained in the area after construction was complete for the day (Appendix I). On 17 March, a pod of 5 adult killer whales initially came into the disturbance zone between construction activities but returned later during vibratory pile-driving activity. On 18 March, a pod of 3 adult killer whales entered the disturbance zone during both vibratory pile-driving and down-hole drilling. On 24 May, a pod of 7 mixed adult and subadult killer whales entered the channel between vibratory hammer activity and returned later during vibratory-hammer activity.

We recorded 6 harbor porpoises in the study area and all were seen in March (Figure 20). A single harbor porpoise was seen within the disturbance zone before construction began on 3 March. A single harbor porpoise also was seen within the disturbance zone while the impact hammer was in operation on 6 March. On 7 March, 2 harbor porpoises were seen while the vibratory

hammer and down-hole drilling were in operation. These 2 records constituted observations of single individuals, with sightings greater than 5 h apart; thus, it is possible that both sightings on 7 March actually were the same individual. On 19 March, a group of 2 harbor porpoises passed through the disturbance zone between construction activity.

#### Steller's eiders

Four groups of Steller's Eiders were seen on 3 separate days in January. Two flocks, one of 2 individuals and the other of 3 individuals, were seen on 1 January during down-hole drilling, but both flocks were more than 150 m from the construction site. On 9 January, 1 Steller's Eider was seen approximately 2,600 m from the construction site while the vibratory hammer was in use. On 13 January, 1 Steller's Eider was observed feeding 283 m from the construction site prior to the start of pile-driving for the day.

#### SHUTDOWNS

From November 2015 to June 2016, we requested 68 shutdowns; 65 of these were due to the presence of wildlife either within the shutdown zone or approaching the outer boundary of the shutdown zone, and the other 3 were due to poor visibility in the shutdown and disturbance zones (Table 5). All 3 weather-related shutdowns occurred during vibratory-hammer operation.

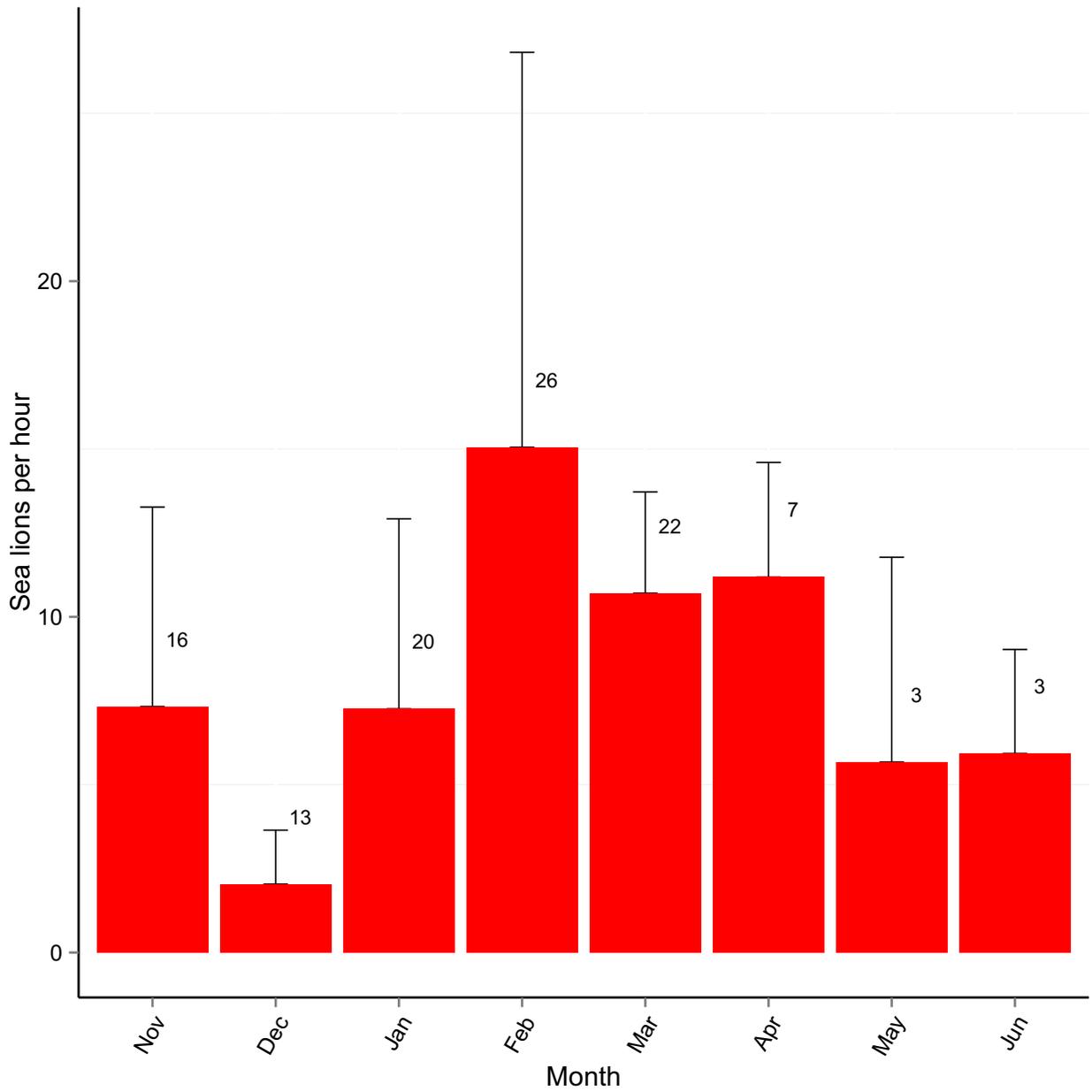


Figure 6. Average number of Steller sea lion per hour recorded for each month in which protected-species monitoring occurred. Numbers above bars indicate the number of days monitored each month, and error bars indicate the standard deviation in hourly rate over each month.

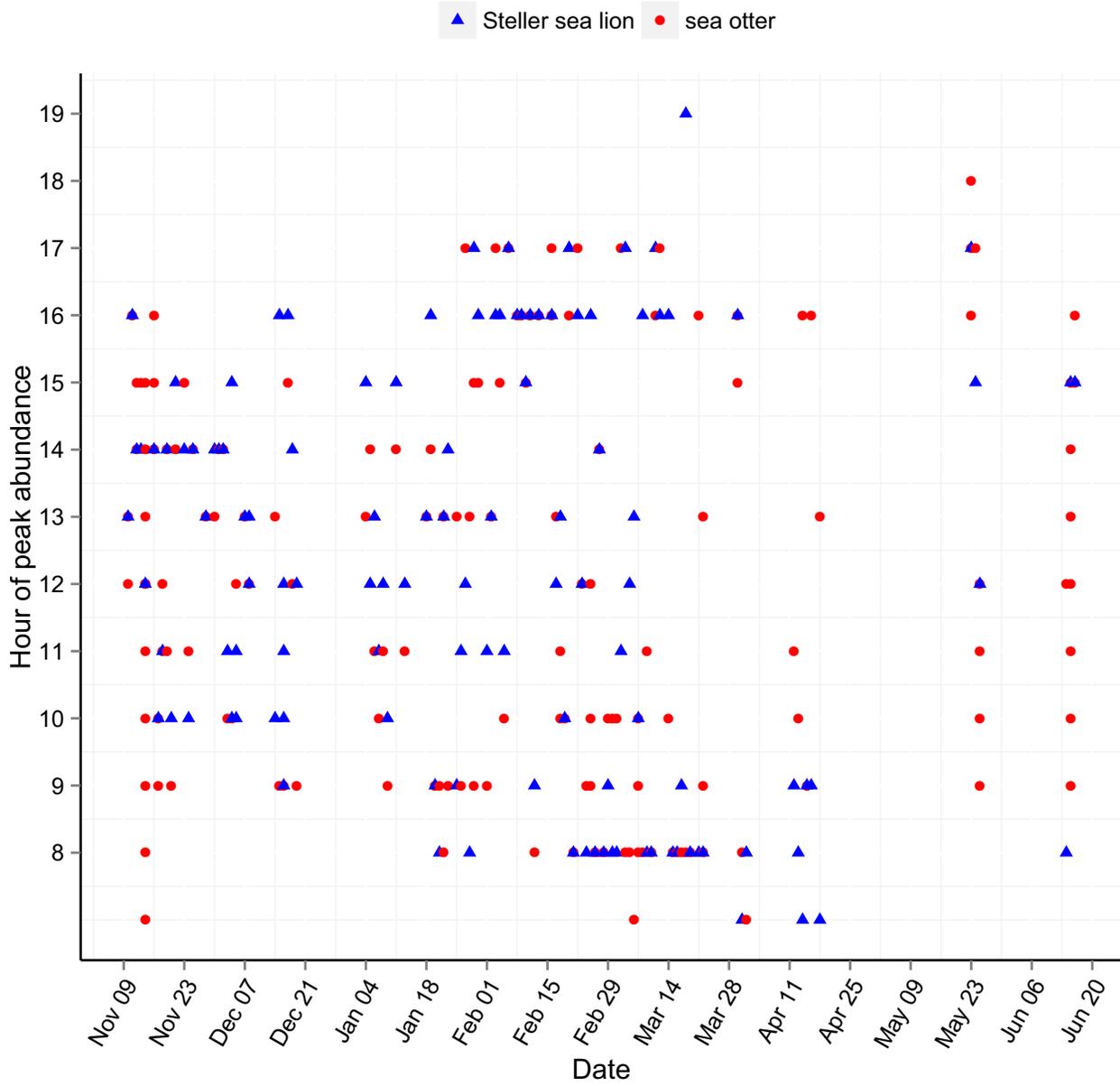


Figure 7. Hour of highest daily animal activity (sightings/h) of Steller’s sea lions and sea otters within the project area for each day observations were conducted ( $n = 110$  days).

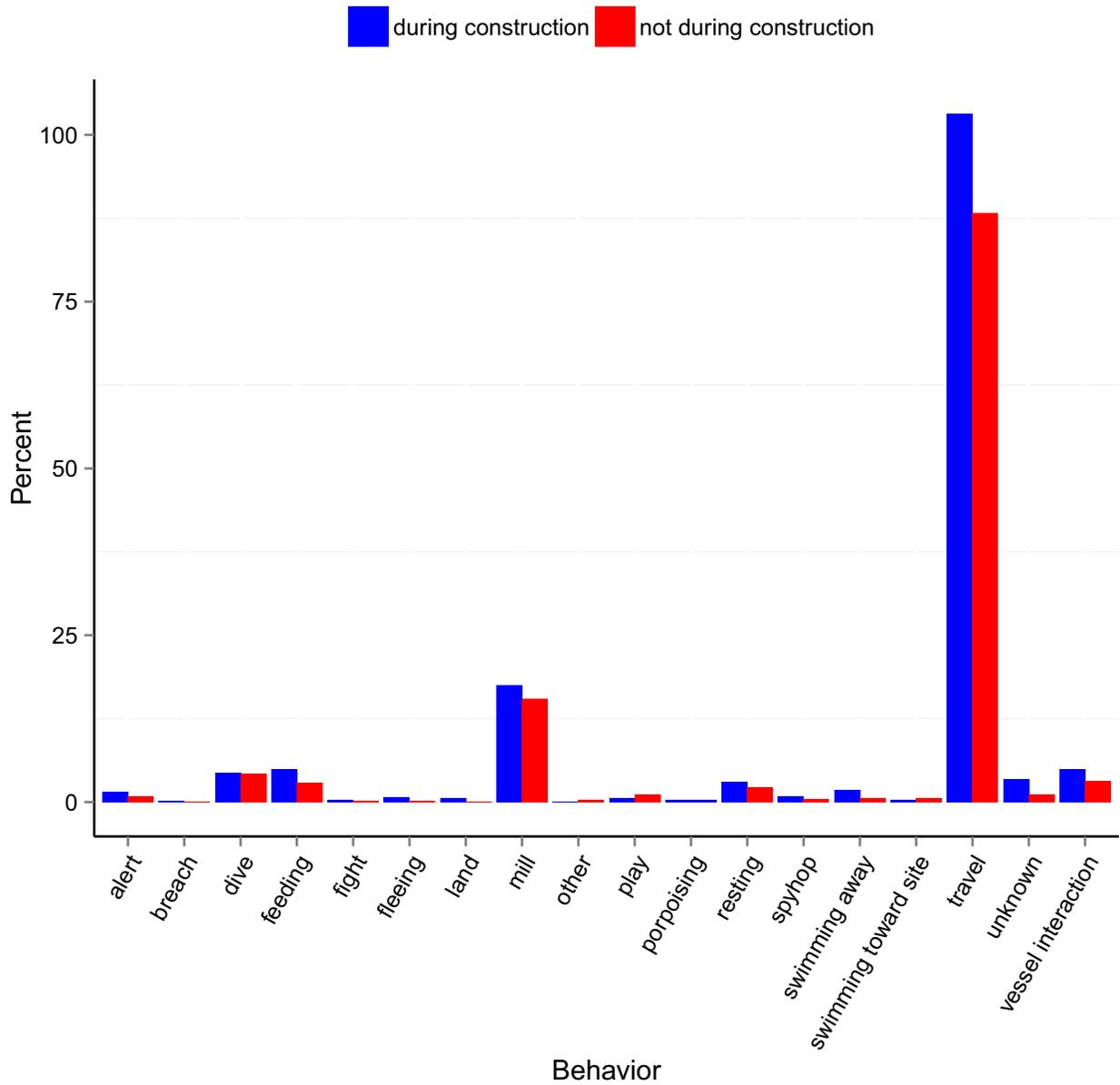


Figure 8. Percentage of behaviors recorded for all sightings of Steller sea lions during and outside of pile-driving activities during the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.



Figure 9. Spatial distribution of Steller sea lion sightings before, after, during, and between pile-driving activities 10 November–19 December 2015. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving.



Figure 10. Spatial distribution of Steller sea lion sightings before, after, during, and between pile-driving activities 4 January–31 March 2016. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving.

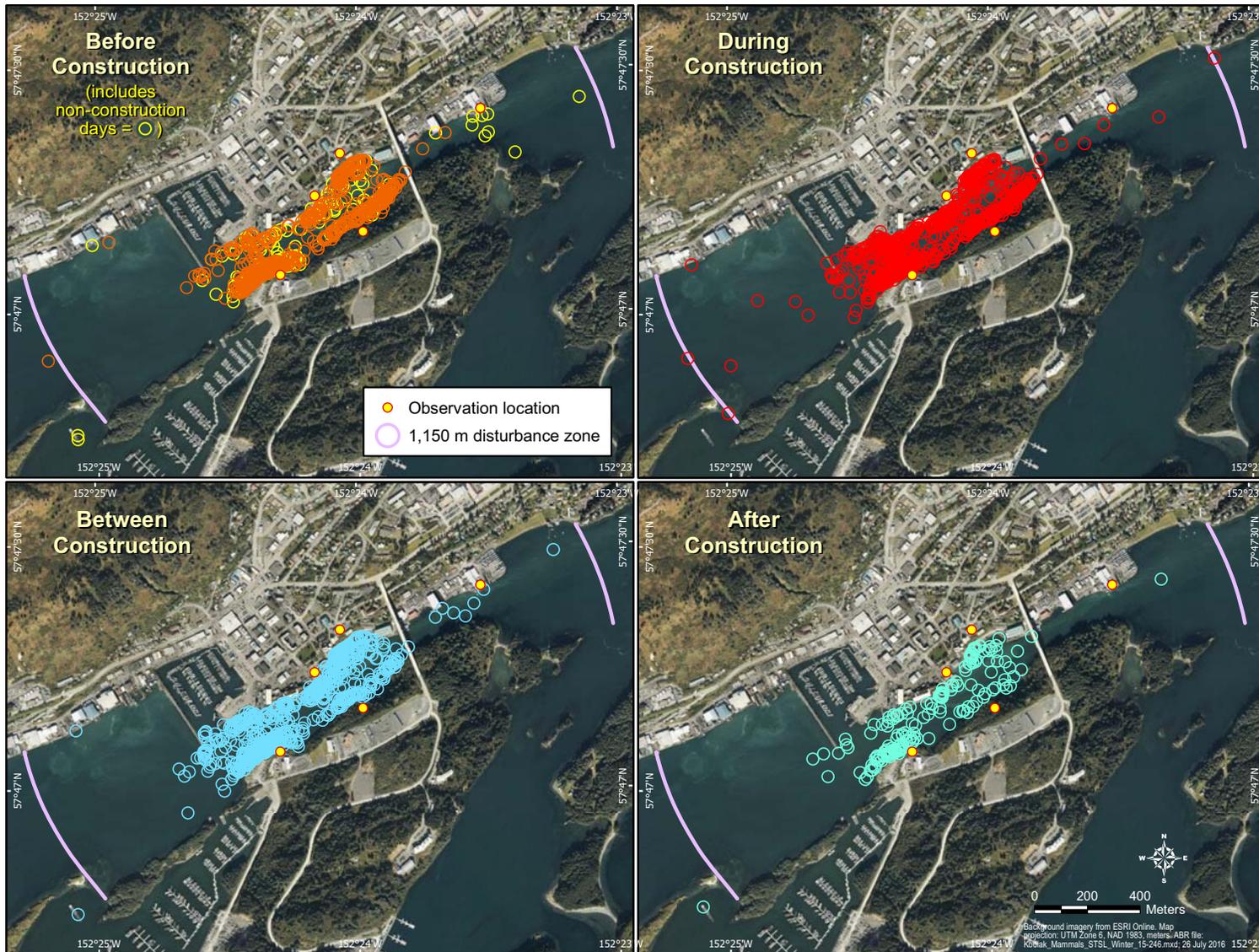


Figure 11. Spatial distribution of Steller sea lion sightings before, after, during, and between pile-driving activities 1 April–16 June 2016. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving.



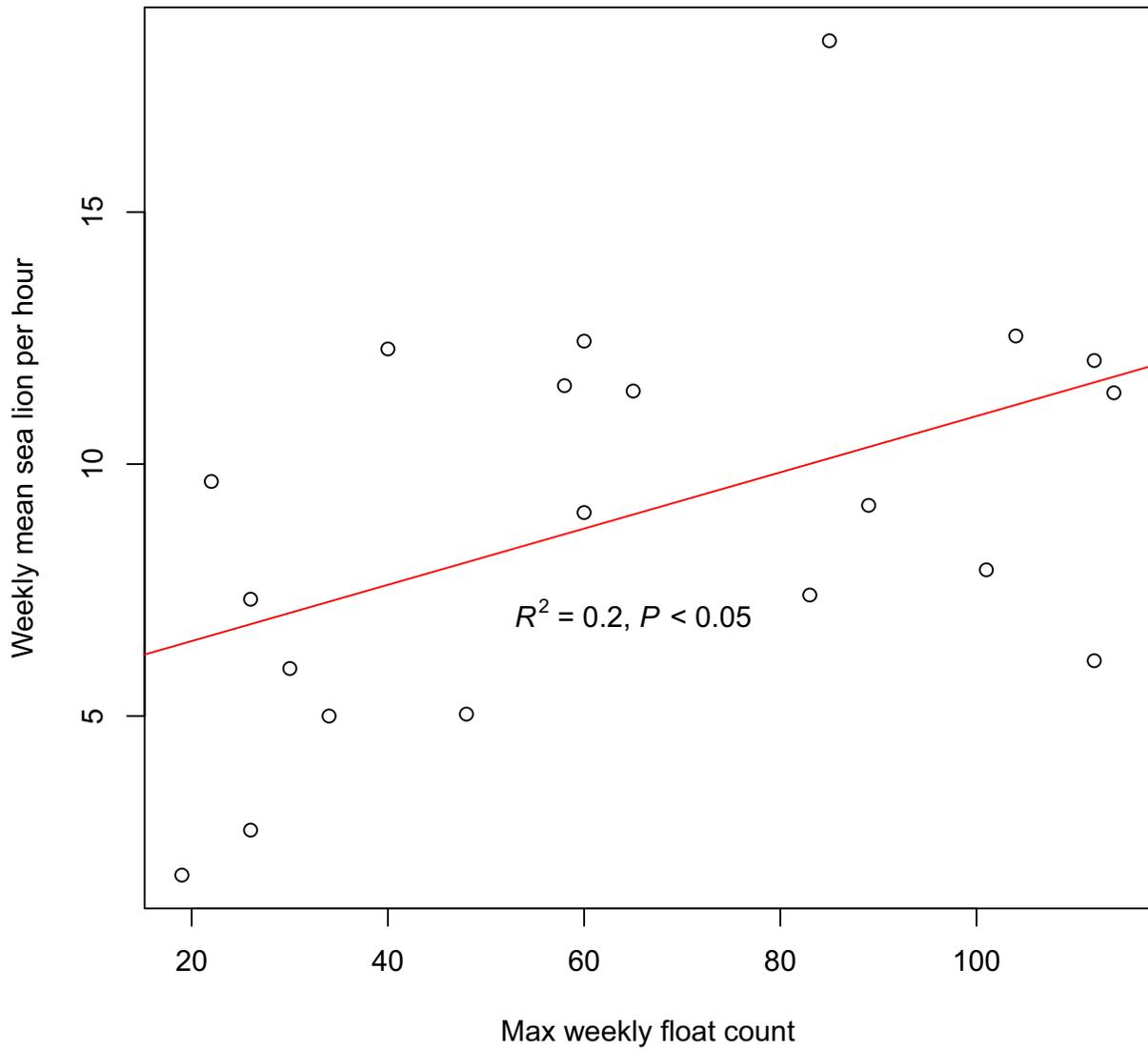


Figure 13. Maximal weekly counts of Steller sea lions at the Dog Bay float compared with maximal weekly rates of Steller's sea lions (individuals/h) recorded in the project area during observations.

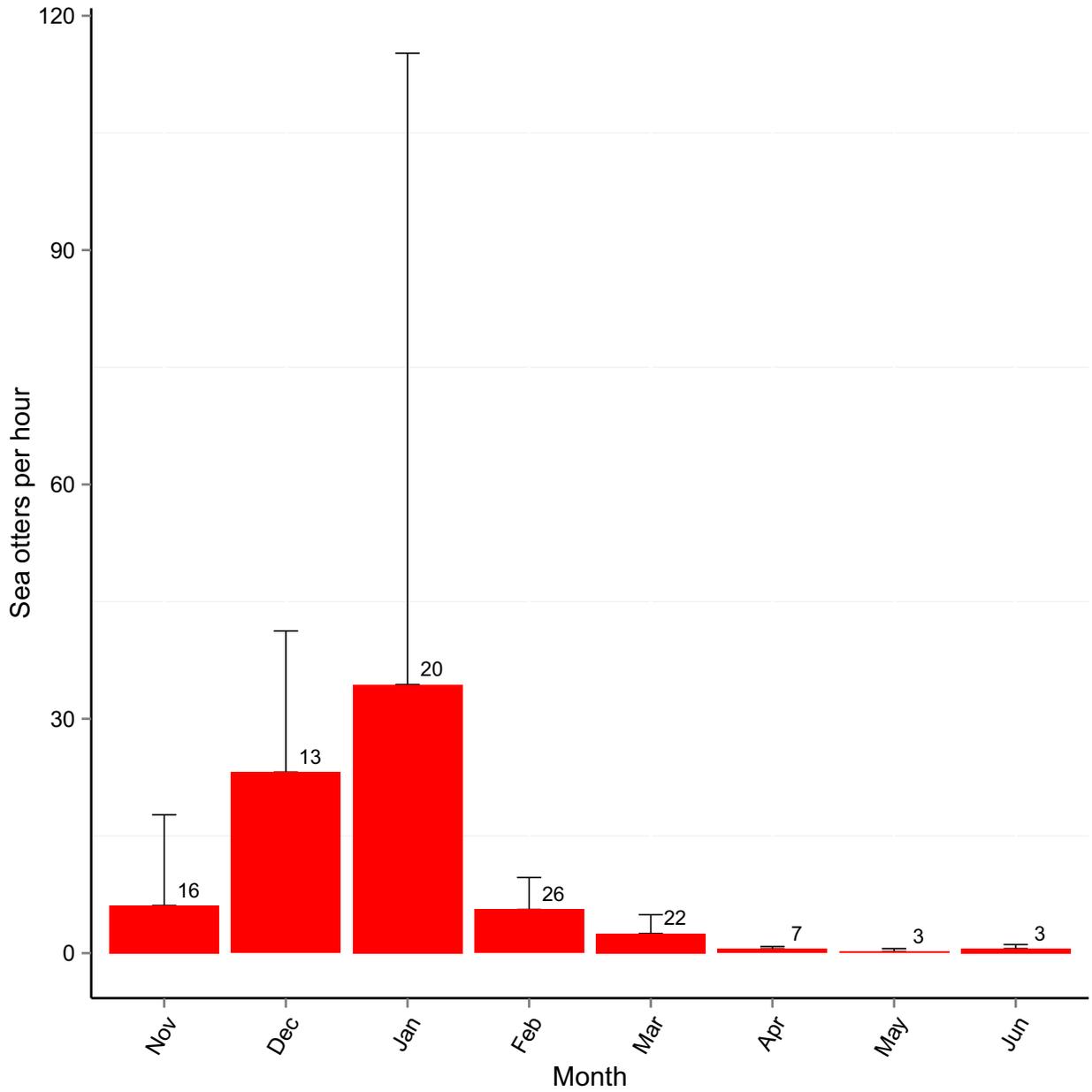


Figure 14. Average number of sea otters per hour recorded for each month in which protected-species monitoring occurred. Numbers above bars indicate the number of days monitored each month, and error bars indicate the standard deviation in hourly rate over each month.

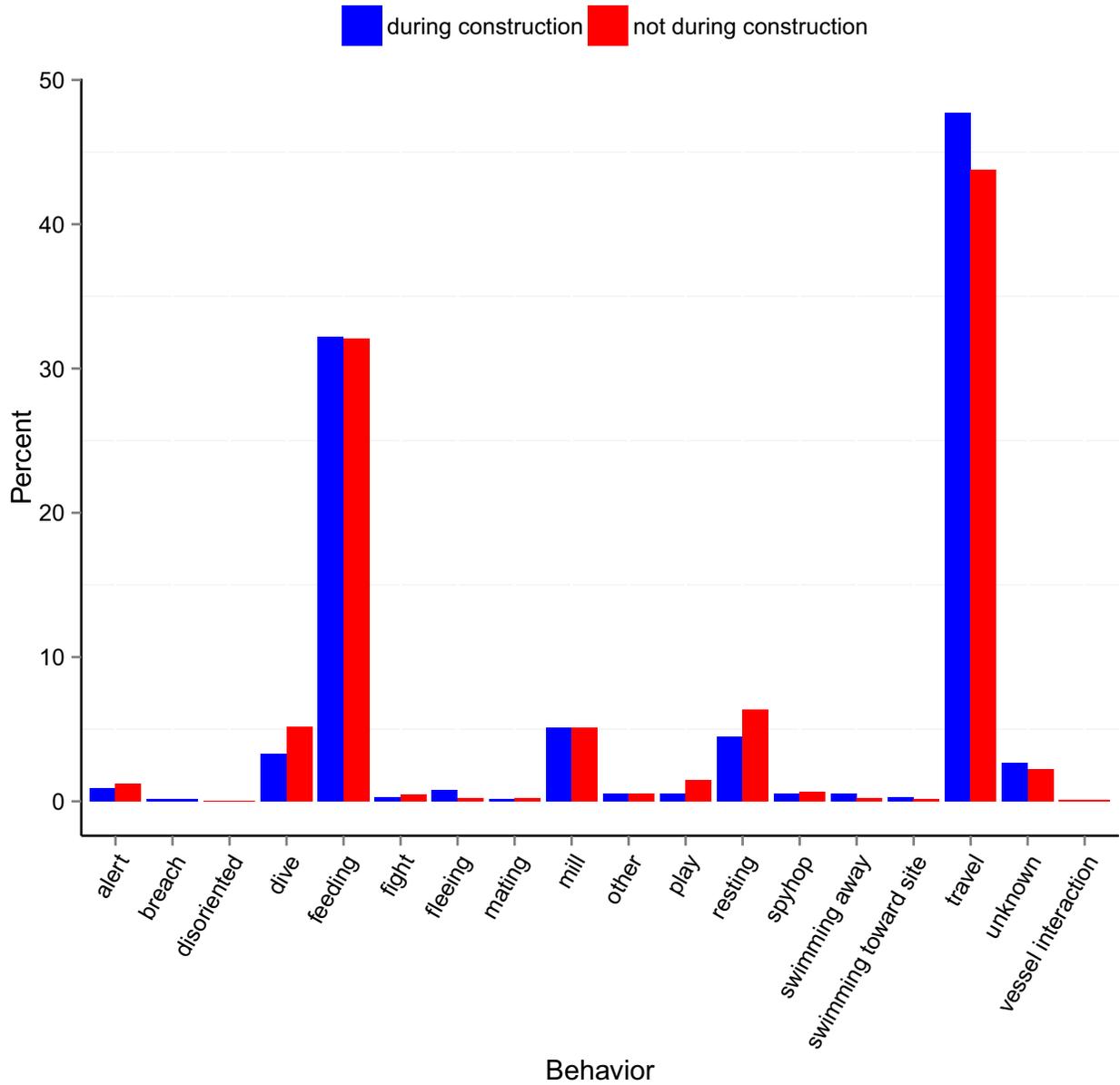


Figure 15. Percentage of behaviors recorded for all sightings of sea otters during and outside of pile-driving activities during the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.



Figure 16. Spatial distribution of sea otter sightings before, after, during, and between pile-driving activities 10 November–19 December 2015. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving. Sightings during pile-driving are limited to observations during down-hole drilling or those that occurred outside of the vibratory and

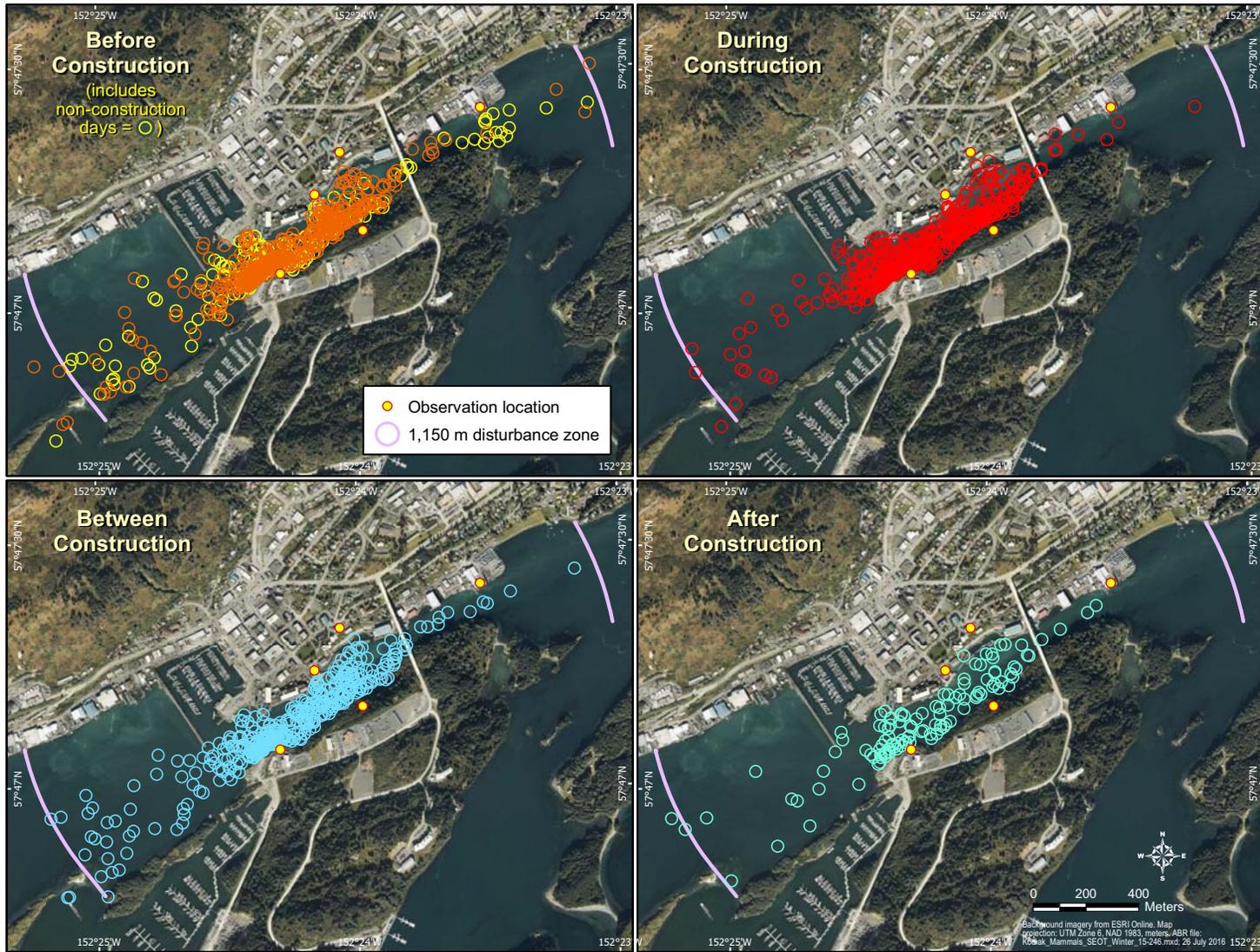


Figure 17. Spatial distribution of sea otter sightings before, after, during, and between pile-driving activities 4 January–31 March 2016. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving. Sightings during pile-driving are limited to observations during down-hole drilling or those that occurred outside of the vibratory and impact pile-driving shutdown boundaries.



Figure 18. Spatial distribution of sea otter sightings before, after, during, and between pile-driving activities 1 April–16 June 2016. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving. Sightings during pile-driving are limited to observations during down-hole drilling or those that occurred outside of the vibratory and impact pile-driving shutdown boundaries.



Figure 19. Spatial distribution of protected-species (excluding Steller sea lion and sea otter) sightings before, after, and between pile-driving activities 10 November–19 December 2015. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving.



Figure 20. Spatial distribution of protected-species (excluding Steller sea lion and sea otter) sightings before, after, and between pile-driving activities 4 January–31 March 2016. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving.



Figure 21. Spatial distribution of protected-species (excluding Steller sea lion and sea otter) sightings before, after, and between pile-driving activities 1 April–16 June 2016. Sightings from non-construction days are shown, with sightings occurring during the half-hour prior to the start of pile-driving.

Table 5. Record of shutdowns and delays between November 2015 and June 2016 for the Kodiak Ferry Terminal and Dock improvements project.

Date	Type	Shutdown time	Ramp-up time <sup>a</sup>	Duration (min)	Construction Activity	Reason	No. Ind.	Behavior <sup>b</sup>
12/17	Shutdown	18:45	18:45	<1	Impact hammer w/caps	Sea otter	1	Travel
1/6	Shutdown	13:00	13:43	43	Impact hammer w/caps	Sea otter	1	Travel
1/6	Shutdown	15:57	15:58	1	Impact hammer w/caps	Sea otter	1	Alert
1/9	Shutdown	10:05	10:12	7	Vibratory hammer	Sea otter	1	Travel
1/18	Delay	14:21	14:27	6	Vibratory hammer	Sea otter	1	Feeding
1/18	Delay	14:40	14:44	4	Vibratory hammer	Sea otter	1	Travel
1/22	Shutdown	15:25	16:15	50	Impact hammer w/caps	Sea otter	1	Travel
1/23	Shutdown	11:50	12:10	20	Impact hammer w/caps	Sea otter	1	Feeding
1/23	Shutdown	12:11	12:25	14	Impact hammer w/caps	Sea otter	1	Travel
1/25	Shutdown	11:03	11:08	5	Vibratory hammer	Sea otter	1	Travel
1/26	Delay	15:08	16:00	52	Vibratory hammer	Sea otter	1	Feeding
1/27	Shutdown	11:01	11:01	<1	Impact hammer w/caps	Sea otter	1	Swimming away from site
1/27	Shutdown	15:38	15:44	6	Vibratory hammer	Sea otter	1	Travel
1/28	Shutdown	17:01	17:05	4	Vibratory hammer	Sea otter	1	Swimming toward site
1/28	Shutdown	17:14	17:20	6	Vibratory hammer	Sea otter	1	Swimming toward site
1/29	Delay	15:42	15:44	2	Vibratory hammer	Sea otter	1	Travel
1/29	Delay	16:40	17:00	20	Impact hammer w/caps	Sea otter	1	Feeding

Table 5. Continued.

Date	Type	Shutdown time	Ramp-up time <sup>a</sup>	Duration (min)	Construction Activity	Reason	No. Ind.	Behavior <sup>b</sup>
2/1	Shutdown	11:21	11:28	7	Vibratory hammer	Sea otter	1	Swimming toward site
2/12	Delay	13:00	13:16	16	Vibratory hammer	Sea otter	1	Resting
2/12	Delay	13:40	13:53	13	Vibratory hammer	Sea otter	1	Alert
2/19	Shutdown	9:52	9:57	5	Vibratory hammer	Sea otter	1	Feeding
2/19	Delay	12:39	12:47	8	Vibratory hammer	Sea otter	1	Travel
2/23	Shutdown	11:54	11:59	5	Vibratory hammer	Sea otter	1	Feeding
2/24	Shutdown	11:30	11:31	1	Vibratory hammer	Sea otter	1	Travel
2/25	Delay	9:20	9:23	3	Vibratory hammer	Sea otter	1	Travel
2/25	Shutdown	9:47	9:54	7	Vibratory hammer	Sea otter	1	Travel
2/25	Delay	10:30	10:37	7	Vibratory hammer	Sea otter	1	Travel
2/25	Delay	13:05	13:10	5	Impact hammer w/caps	Sea otter	1	Play
2/25	Delay	16:35	16:43	8	Vibratory hammer	Sea otter	1	Travel
2/26	Shutdown	9:25	9:30	5	Vibratory hammer	Sea otter	1	Mill
2/27	Delay	8:53	9:51	58	Vibratory hammer	Sea otter	1	Feeding
2/27	Shutdown	10:35	10:39	4	Vibratory hammer	Sea otter	1	Travel
2/27	Shutdown	11:17	11:29	12	Vibratory hammer	Sea otter	1	Travel
2/27	Shutdown	11:40	11:51	11	Vibratory hammer	Sea otter	1	Travel
2/27	Delay	12:58	13:00	2	Impact hammer w/caps	Sea otter	1	Feeding

Table 5. Continued.

Date	Type	Shutdown time	Ramp-up time <sup>a</sup>	Duration (min)	Construction Activity	Reason	No. Ind.	Behavior <sup>b</sup>
2/27	Shutdown	13:06	13:26	20	Impact hammer w/caps	Sea otter	1	Travel
2/27	Delay	16:04	16:25	21	Vibratory hammer	Sea otter	2	Play
3/1	Delay	8:54	8:56	2	Vibratory hammer	Sea otter	1	Feeding
3/1	Shutdown	9:06	9:11	5	Vibratory hammer	Sea otter	1	Travel
3/1	Shutdown	9:23	9:25	2	Vibratory hammer	Sea otter	1	Travel
3/1	Delay	10:27	10:41	14	Impact hammer w/caps	Sea otter	7	Travel
3/1	Shutdown	10:46	10:55	9	Impact hammer w/caps	Sea otter	1	Travel
3/3	Delay	17:06	17:12	6	Vibratory hammer	Sea otter	1	Travel
3/4	Delay	17:29	17:48	19	Vibratory hammer	Visibility	n/a	n/a
3/6	Shutdown	8:23	8:39	16	Vibratory hammer	Sea otter	1	Feeding
3/6	Shutdown	8:43	8:50	7	Vibratory hammer	Sea otter	2	Dive
3/6	Shutdown	9:45	9:58	13	Vibratory hammer	Sea otter	1	Feeding
3/6	Delay	10:21	10:33	12	Vibratory hammer	Sea otter	1	Feeding
3/6	Delay	11:01	11:23	22	Impact hammer w/caps	Sea otter	1	Mill
3/6	Delay	16:35	16:57	22	Vibratory hammer	Sea otter	1	Unknown <sup>c</sup>
3/7	Shutdown	14:00	14:04	4	Vibratory hammer	Sea otter	1	Travel
3/8	Delay	17:14	17:45	31	None <sup>d</sup>	Sea otter	1	Mill
3/9	Delay	10:45	12:40	115	None <sup>e</sup>	Sea otter	1	Feeding
3/10	Delay	8:50	9:25	35	None <sup>f</sup>	Sea otter	1	Feeding

Table 5. Continued.

Date	Type	Shutdown time	Ramp-up time <sup>a</sup>	Duration (min)	Construction Activity	Reason	No. Ind.	Behavior <sup>b</sup>
3/15	Delay	16:42	16:55	13	Impact hammer w/caps	Sea otter	1	Feeding
3/18	Shutdown	10:08	10:12	4	Vibratory hammer	Sea otter	1	Dive
3/18	Delay	10:18	10:24	6	Vibratory hammer	Sea otter	1	Travel
3/19	Shutdown	9:29	9:47	18	Vibratory hammer	Sea otter	1	Feeding
3/19	Delay	9:58	10:02	4	Impact hammer w/caps	Sea otter	1	Resting
3/19	Shutdown	12:31	12:36	5	Vibratory hammer	Visibility	n/a	n/a
3/21	Shutdown	16:01	16:27	26	Impact hammer w/caps	Sea otter	1	Travel
3/31	Shutdown	9:30	9:40	10	Impact hammer w/caps	Sea otter	1	Dive
3/31	Shutdown	15:21	15:43	22	Vibratory hammer	Visibility	n/a	n/a
3/31	Shutdown	16:53	17:00	7	Vibratory hammer	Sea otter	1	Travel
4/1	Delay	8:03	8:09	6	Vibratory hammer	Sea otter	1	Feeding
4/14	Delay	14:13	14:34	21	Impact hammer w/caps	Sea otter	1	Travel
4/14	Shutdown	13:50	13:53	3	Vibratory hammer	Sea otter	1	Feeding
4/16	Shutdown	12:04	12:19	15	Vibratory hammer	Sea otter	1	Feeding

<sup>a</sup> If pile driving activity did not resume for the day, but the construction crew switched to a different activity, then ramp-up time is the time that the construction crew reported they would not be resuming pile driving activity.

<sup>b</sup> A complete list of behaviors recorded is in Appendix E.

<sup>c</sup> This otter was observed feeding in zone at 16:57, after its initial observation.

<sup>d</sup> The construction crew had quit for the day by the time this sea otter cleared out of the area.

<sup>e</sup> At 12:40 the construction crew decided there would not be any more pile driving activity for the day.

<sup>f</sup> At 9:25 am pile driving activity ceased for the day to due to barge activity in the construction zone.

All of the 65 wildlife-related shutdowns were due to the presence of sea otters in or entering the shutdown zones; none were due to the presence of IHA-listed species. Nineteen events (11 shutdowns, 8 delays) occurred when sea otters approached within 300 m of the construction site during impact pile-driving (with cushions), and 43 events (25 shutdowns, 18 delays) occurred when sea otters approached within 100 m during vibratory pile-driving. During the other 3 delays, all involving sea otters, pile-driving activity did not resume either because the construction crew reached the end of their work day prior to the area being cleared or because other tasks were taken up. In these cases, we considered the duration of the delay to be from the time we notified DOT&PF of the animal being present to the time we were notified that there would be no further pile-driving activity. Excluding these 3 events, the average and standard error of the duration of shutdown/delay events was  $12.2 \pm 1.5$  min ( $14.3 \pm 3.3$  min for impact-driving w/cushions;  $10.8 \pm 1.6$  min for vibratory-driving), with a minimal duration of less than 1 min and a maximal duration of 58 min.

Sea otters observed in the disturbance and shutdown zones exhibited a variety of behaviors, but only 3 otters entering the shutdown zone exhibited disturbance-associated behaviors. On 6 January, at 15:57, impact driving was halted when an otter exhibiting alert behavior was seen entering the shutdown zone; the shutdown lasted 1 min before the animal departed. On 27 January at 11:01, a shutdown was initiated when an otter was seen swimming away from the construction site; duration of the shutdown was <1 min. A construction delay was initiated on 12 February at 13:40 due to the presence of an alert otter in the

shutdown zone; the animal remained in the area for 13 min before departing. Vibratory drilling had been conducted earlier that hour but was not underway when the otter was seen entering the shutdown zone.

#### INCIDENTS OF TAKE

The “take” totals presented here are observed take, rather than extrapolated take because the observers had complete visual coverage of the disturbance and shutdown zones. During surveys of the disturbance and shutdown zones associated with the project, we recorded 1,315 Level B takes, which was <40% of the take limit for each species individually and for all species combined (Table 6). Of these takes, 98.4% (1,281 animals in 760 groups) were Steller sea lions; the remaining takes were killer whales (1.1%; 15 animals in 3 groups), harbor porpoises (0.23%; 3 animals in 3 groups), and harbor seals (0.23%; 3 animals in 3 groups; Table 6). There were no Level A takes of any species during observations. Because no Steller’s Eiders occurred within the shutdown zone during pile-driving activity, we did not record any take at any level for Steller’s Eiders. For northern sea otters, shutdowns were initiated immediately after any individual entered the shutdown zone; consequently, we did not record any take for sea otters during this study. Marine mammals not covered by the IHA did not occur within the shutdown or disturbance zones during pile-driving activity, consequently, no takes were recorded.

During construction activities, there were 1,281 incidents of Level B take of Steller sea lions. Few sea lions (51 individuals in 27 groups) observed in the disturbance (Level B take) zone exhibited behaviors associated with disturbance

Table 6. Summary of Level B takes observed in the vicinity of the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016. No Level A takes were recorded during this project.

Species	Number of Groups	Number of Individuals	Authorized Level B Takes	Percent of Authorized Level B Takes
Steller sea lion	768	1,281	3,260	39.7
Harbor seal	3	3	40	7.5
Killer whale	3	15	48	31.3
Harbor porpoise	3	3	40	7.5
Total	777	1,315	3,388	38.8

(e.g., alert, fleeing, or swimming away from the construction site; Figure 8, Appendix I). For 5 of these instances (11 individuals), the disturbance behavior could be attributed to activities other than construction (2 in response to killer whales, 3 in response to marine vessels). On 2 other occasions in which disturbance behavior was recorded, the animals involved appeared to be responding directly to construction activity (alert behavior following construction noise or swimming away from the construction site rapidly immediately after looking in the direction of construction activity). Over half (49%; 25 animals in 9 groups) of these sea lions exhibited alert behavior: 37% (19 animals in 13 groups) were observed swimming away from the construction site, and 14% (7 animals in 5 groups) were fleeing. On one occasion, we saw one male sea lion exhibiting alert behavior prior to entering the disturbance zone during down-hole drilling; it entered the disturbance zone 33 min later and remained for less than 5 min but did not exhibit further disturbance behavior. Most sea lions exhibiting disturbance behavior within the disturbance zone during construction activities were adults (53%; 27 animals in 17 groups) or mixed groups of adults and subadults (29%; 15 animals in 4 groups). None of the harbor seals we observed exhibited disturbance behavior. Harbor seals were observed travelling (2 individuals) and milling (1 animal).

Cetaceans observed in the disturbance (Level B take) zone primarily were recorded travelling through the disturbance zone (Table 7). Of the 3 groups of killer whales, 2 were observed milling (1 group of 5 adults and 1 group of 3 adults) and the other group (7 adults and calves) was observed travelling through the disturbance zone (Appendix I). Eight of the 15 Level B takes of killer whales were adults (2 groups); the remaining 7 individuals were a mixed group of adults and calves. One of the 3 Level B takes of harbor seals was an adult; the remaining 2 were of unknown age. All 3 harbor porpoises taken were observed travelling were of unknown age (Table 7).

## INJURED OR DEAD ANIMALS

No injured or dead animals were recorded by ABR wildlife observers or DOT&PF personnel during this project.

## CONCLUSIONS

Protected-species monitoring during the Kodiak Ferry Terminal and Dock Improvement Project was successful in ensuring that there was no unauthorized take of marine mammals or Steller's Eiders. Observers could see all areas of the disturbance and shutdown zones adequately and communicated efficiently with a DOT & PF representative when an animal was approaching the shutdown zone. The construction crew was able to shut down immediately upon notification from the observers and redirected its efforts until the shutdown zone was clear. Sea otters were the only species requiring a shutdown or delay in pile-driving activities, and the average shutdown duration was less than 15 min.

The total amount of level B take for IHA authorized species was <40% of the authorized amount and included all 4 species included in the IHA; however, take occurred primarily in Steller sea lion. Disturbance behaviors represented <1% of all behaviors observed and occurred in similar proportions between construction and non-construction periods. The spatial distribution of both sea lions and sea otters was similar during all phases of construction activity. Other species occurred too infrequently to evaluate spatial distributions between construction and non-construction periods.

Table 7. Breakdown of age and behavior characteristics associated with protected species recorded as level B take during the Kodiak Ferry Terminal and Dock improvements project, November 2015–June 2016.

Species	Behavior	Age unk.		Adult		Juvenile		Calve/pup		Mixed adult/ calve		Mixed adult/subadult		All Ages	
		ind.	grps	ind.	grp	Ind.	grps	Ind.	grps	Ind.	grps	Ind.	grps	Ind.	grps
Steller sea lion	alert	0	0	10	4	5	2	1	1	0	0	0	1	19	8
	dive	9	8	10	10	6	6	3	1	0	0	0	0	28	25
	feeding	4	3	29	17	3	3	0	0	0	0	0	2	40	25
	fight	0	0	4	2	0	0	0	0	0	0	0	0	4	2
	fleeing	0	0	5	3	1	1	1	1	0	0	0	0	7	5
	vessel interaction	1	1	56	27	0	0	0	0	0	0	0	3	80	31
	mill	8	5	118	72	13	10	0	0	0	0	0	7	161	94
	on land	0	0	2	2	2	1	0	0	0	0	0	0	4	3
	play	0	0	7	3	1	1	0	0	0	0	0	0	8	4
	resting	1	1	10	7	1	1	0	0	0	0	0	3	28	12
	spyhop	1	1	6	4	1	1	0	0	0	0	0	0	8	6
	swimming away from site	1	1	11	9	1	1	0	0	0	0	0	2	19	13
	Swimming toward site	0	0	2	2	1	1	0	0	0	0	0	0	3	3
	travel	44	34	414	313	175	101	25	15	42	11	0	36	840	510
	unknown	5	4	17	12	4	2	0	0	0	0	0	1	32	19
<b>All Behaviors</b>	<b>74</b>	<b>58</b>	<b>701</b>	<b>487</b>	<b>214</b>	<b>131</b>	<b>30</b>	<b>18</b>	<b>42</b>	<b>11</b>	<b>220</b>	<b>55</b>	<b>1,281</b>	<b>759</b>	

Table 7. Continued.

Species	Behavior	Age unk.		Adult		Juvenile		Calve/pup		Mixed adult/ calve		Mixed adult/subadult		All Ages	
		ind.	grps	ind.	grp	Ind.	grps	Ind.	grps	Ind.	grps	Ind.	grps	Ind.	grps
Harbor seal	mill	1	1	0	0	0	0	0	0	0	0	0	0	1	1
	travel	1	1	1	1	0	0	0	0	0	0	0	0	2	2
	<b>All behaviors</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
Killer whale	mill	0	0	8	2	0	0	0	0	0	0	0	0	8	2
	travel	0	0	0	0	0	0	0	0	7	1	0	0	7	1
	<b>All behaviors</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>3</b>
Harbor porpoise	travel	3	3	0	0	0	0	0	0	0	0	0	0	3	3
	<b>All behaviors</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
Total		74	58	713	490	214	131	30	18	49	12	0	55	1304	768

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Appendix A. Marine Mammal Monitoring and Mitigation Plan for the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.

**Marine Mammal Monitoring and  
Mitigation Plan**

# **Kodiak Ferry Terminal and Dock Improvements Project**

**State Project #68938**

June 2015

Prepared for:

Alaska Department of Transportation and Public Facilities  
6860 Glacier Highway  
Juneau, Alaska 99801

Prepared by:

HDR

With Input from:

R&M Consultants, Inc.



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## Attachments

Attachment 1: Data Forms

## Acronyms and Abbreviations

4MP	Marine Mammal Monitoring and Mitigation Plan
BA	Biological Assessment
dB	Decibel
DOT& PF	Alaska Department of Transportation and Public Facilities
ESA	Endangered Species Act
FR	<i>Federal Register</i>
IHA	Incidental Harassment Authorization
MMPA	Marine Mammal Protection Act
μPa	MicroPascal
NMFS	National Marine Fisheries Service
rms	Root Mean square
wDPS	Western Distinct Population Segment



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## 1.0 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile installation and extraction for the proposed Kodiak Ferry Terminal and Dock Improvements Project at Pier 1 in Kodiak, Alaska. The 4MP was prepared as an appendix to the request for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA), and in support of the Biological Assessment (BA) for formal Section 7 consultation with the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA).

The Pier 1 project will reconstruct an existing ferry terminal, including the removal and installation of piles in the marine environment. The project has the potential to generate elevated levels of underwater and in-air noise that could exceed Level A (injury) and Level B (disturbance) harassment thresholds established by NMFS for marine mammals under the MMPA (70 Federal Register [FR] 1871-1875).

Level A harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment means any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering, but that does not have the potential to injure a marine mammal or marine mammal stock in the wild.

NMFS has defined levels of harassment for marine mammals under water as:

- **Level A Harassment – injury by continuous or impulse noise:** NMFS has established a “do not exceed” exposure criterion of 180 decibels (dB) re 1 microPascal ( $\mu$ Pa) root mean square (rms) for cetaceans and 190 dB re 1  $\mu$ Pa rms for pinnipeds.
- **Level B Harassment – harassment by impulse noise** (e.g., impact pile driving and down-hole drilling) is set at 160 dB re 1  $\mu$ Pa rms.
- **Level B Harassment – harassment by continuous noise** (e.g., vibratory pile driving) is set at 120 dB re 1  $\mu$ Pa rms (70 FR 1871-75).

Steller sea lions (*Eumetopias jubatus*) from the western Distinct Population Segment (wDPS), harbor seals (*Phoca vitulina*), harbor porpoises (*Phocoena phocoena*), and killer whales (*Orcinus orca*) may occur in the Pier 1 project area, and a small number of Level B takes was requested for these marine mammals. A small number of Level A takes was also requested for Steller sea lions. Humpback whales (*Megaptera novaeangliae*), fin whales (*Balaenoptera physalus*), gray whales (*Eschrichtius robustus*), and Dall’s porpoises (*Phocoenoides dalli*) generally inhabit more offshore habitats than the Near Island channel and are not expected to occur in the vicinity of the Pier 1 project area; no Level A or Level B take was requested for these species, and pile removal or installation will be halted to avoid take of these species.

The overall goal of this 4MP is to ensure compliance with the ESA and MMPA when the 4MP is implemented by the Wildlife Observers at the project site. This 4MP has been developed to minimize and mitigate harassment to marine mammals during Pier 1 construction activities, and to monitor and record the extent of harassment when it does occur. This 4MP also describes the methods that will be used to monitor and record the extent of Level A and Level B harassment. Please refer to the IHA application and BA prepared for the Pier 1 project for a more detailed discussion of the project and its potential effects on marine mammals, including additional details on mitigation methods that will be implemented during construction.



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## 2.0 HARASSMENT THRESHOLDS

Distances to the harassment thresholds, as defined by sound isopleths, vary by marine mammal type and by pile-removal and installation tool (Table 2-1). The Level B harassment isopleth will be 3 meters during down-hole drilling, 225 meters during impact pile installation when pile caps are used, and 1,136 meters during vibratory pile installation or removal (Table 2-1; Figure 2-1). The Level B harassment isopleth for vibratory pile driving will be rounded up to 1,150 meters for monitoring purposes for the Pier 1 project. The Level B harassment zone for down-hole drilling is too small, at 3 meters, to be illustrated to scale and is not shown in Figure 2-1. The monitored Level B harassment zone for vibratory pile installation and removal will include the entire area that is ensonified within Near Island Channel, and then will extend along the channel to the northeast and southwest based on vectors from the sound source. Marine waters will not be monitored if they are located behind landmasses such as islands or headlands that have blocked transmission of sound, as it will be assumed that these areas will not be ensonified.

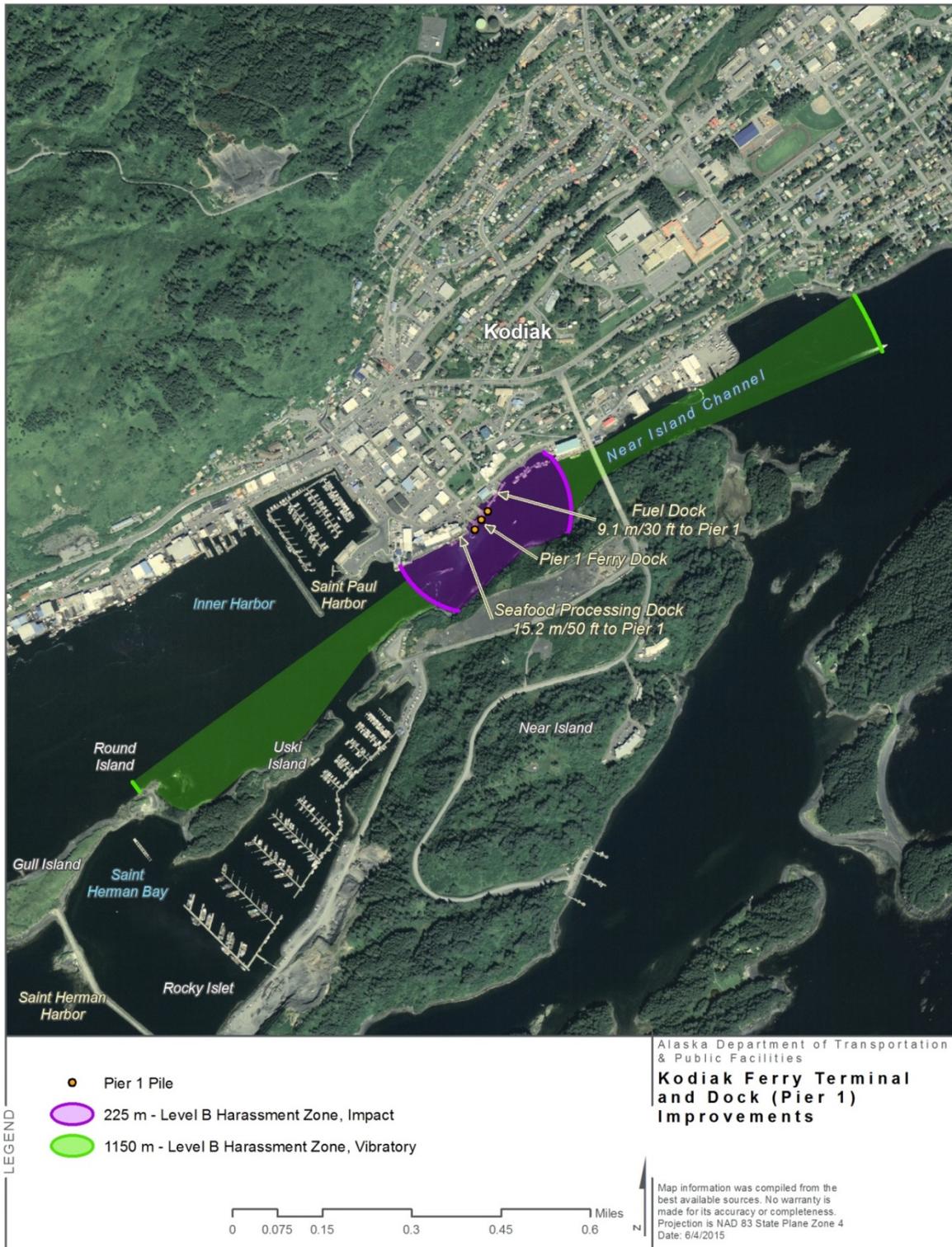
Level A harassment of Steller sea lions would occur only within 4 meters if pile caps are used during impact hammering, or within 9 meters if pile caps are not used (Table 2-1; Figure 2-2).

**Table 2-1. Distances in meters from Pier 1 construction activity to NMFS' Level A and Level B harassment thresholds (isopleths) for different pile installation and extraction methods and pile types, assuming a 125-dB background noise level**

Method, pile type	Level A		Level B
	Pinnipeds	Cetaceans	Pinnipeds and Cetaceans
<b>Vibratory Hammer</b>			
Timber pile extraction	<1	<1	506
Steel H-piles	<1	<1	167
24-inch steel piles	<1	1	1,136
18-inch steel piles	<1	1	1,136
16-inch timber piles	<1	1	1,136
<b>Down-hole Drill</b>			
24-inch steel piles	<1	<1	3
<b>Impact Hammer</b>			
<b>With caps</b>			
24-inch steel piles	4	15	225
<b>Without caps</b>			
24-inch steel piles	9	34	508



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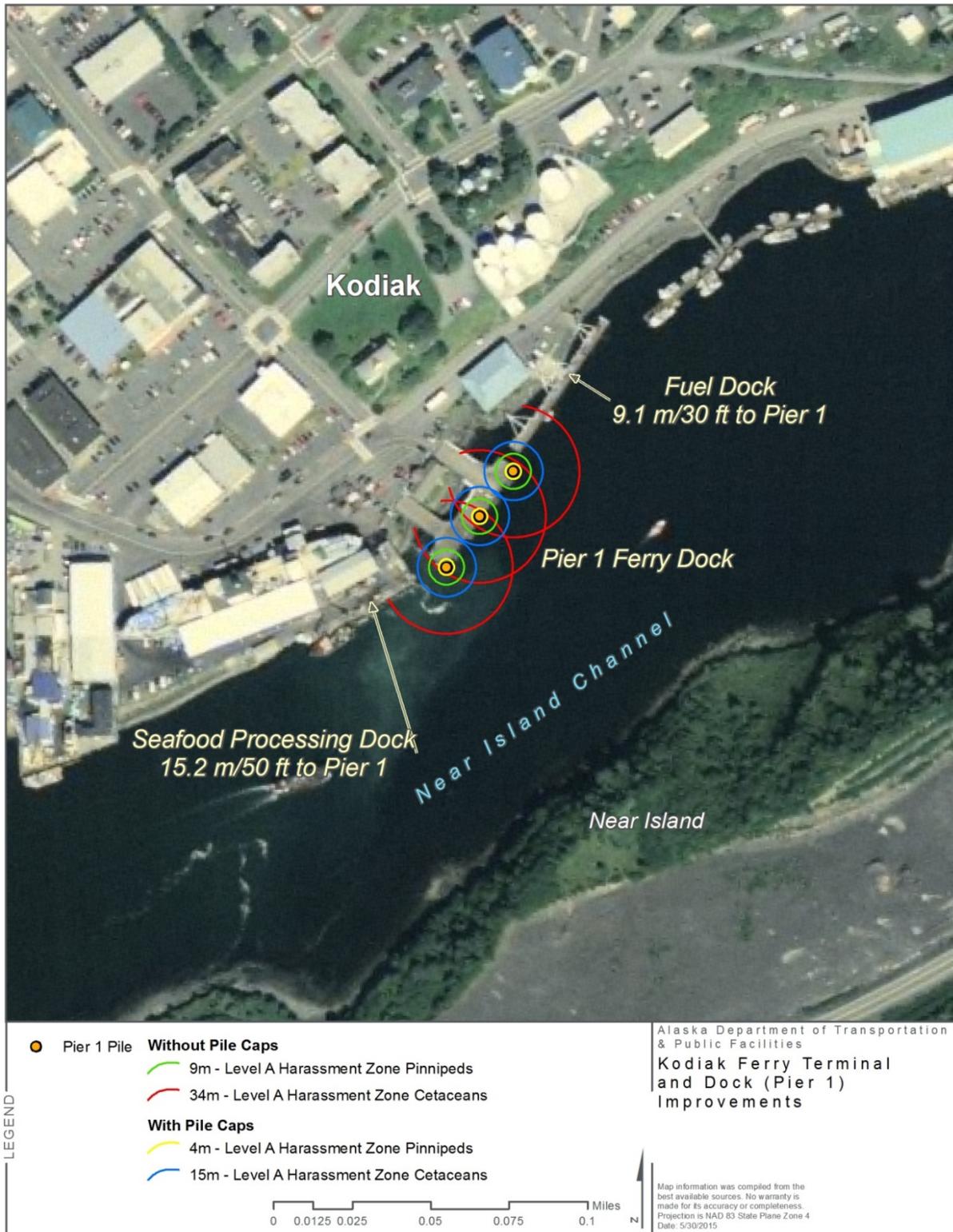


**Figure 2-1. Distances to the underwater 125 dB rms (vibratory noise, rounded to 1,150 meters) and 160 dB rms (impact noise) Level B isopleths**

Note that the distance to the underwater 160 dB rms down-hole drilling Level B isopleth is 3 meters and is not depicted in this figure due to scale and clarity. Harassment zones are based on vectors radiating from the sound source where landforms and solid dock structures do not block sound and are illustrated accordingly.



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**Figure 2-2. Distances to the underwater sound isopleths for Level A harassment for impact pile installation for cetaceans and pinnipeds**



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## 3.0 MARINE MAMMAL MONITORING

To minimize impacts of project activities on marine mammals, Wildlife Observers will be present at the Pier 1 site during down-hole drilling, impact pile installation, and vibratory pile removal and installation. Wildlife Observers will search for, monitor, document, and track marine mammals around and within the Level A and Level B harassment zones (Figure 2-1 and Figure 2-2). It should be noted that the titles Protected Species Observer, Marine Mammal Observer, and Wildlife Observer are intended to be synonymous for consultation, documentation, and construction purposes.

### 3.1 Monitoring Overview

One Wildlife Observer will begin observations of the appropriate harassment zones 30 minutes prior to the start of pile installation or extraction, and will continue to observe for 20 minutes after completion of pile installation or extraction. During monitoring, the Wildlife Observer will scan the water every few minutes with high-quality binoculars, and will use the naked eye to scan during the remainder of the time. A high-powered spotting scope will also be available for scanning greater distances, so that any marine mammals swimming toward the harassment zones can be observed.

A second Wildlife Observer will be available to observe during alternate shifts of 4–6 hours each day to prevent fatigue. When not monitoring at the Pier 1 project site, the second Wildlife Observer will conduct periodic visual surveys of the Dog Bay float. Monitoring numbers of Steller sea lions hauled out on the Dog Bay float will provide an index of numbers using the harbor area, which may reflect the number of individual sea lions in the Pier 1 project vicinity. Counts of Steller sea lions hauled out on the Dog Bay float will be conducted at least twice per week during the in-water construction period at Pier 1. Four counts will be made per day to account for variability in numbers due to time of day, tide, and other factors.

Wildlife Observers will have no other construction-related tasks or responsibilities while monitoring for marine mammals. Each Wildlife Observer will be trained in marine mammal identification and behaviors, and provided with reference materials to ensure standardized and accurate observations and data collection.

Before construction commences, the Wildlife Observers will meet with the Contractor and DOT&PF to determine the most appropriate observation platform for monitoring during pile removal and installation. Considerations will include:

- Height of the observation platform, to maximize field of view and distance
- Ability to see the harassment zones
- Safety of the Wildlife Observers, construction crews, and other people present during construction
- Minimization of interference with construction activities

A clear authorization and communication system will be in place to ensure that Wildlife Observers and the construction crew understand their respective roles and responsibilities. If pile installation or extraction must be powered down or shut down to avoid take, the Wildlife Observer will contact a designated member of the construction crew. A “shutdown” is defined as a duration of 30 minutes or more when in-water noise from pile removal or installation does

not occur. All communications with the construction crew will be documented in the environmental conditions and construction activities log (Section 3.3.2). Although it is the role of the Wildlife Observers to watch for marine mammals, DOT&PF construction personnel will be trained and instructed to notify the Wildlife Observers immediately if they observe a marine mammal.

Specific aspects and protocols of marine mammal observations will also include:

- Monitoring distances will be measured with range finders.
- Distances to animals will be based on the best estimate of the Wildlife Observer, relative to known distances to objects in the vicinity of the Wildlife Observer.
- Bearings to animals will be determined by using a compass.
- Pre-Activity Monitoring:
  - The Level A and Level B harassment zones will be monitored for 30 minutes prior to in-water pile removal or installation.
  - If a marine mammal is present within the Level A harassment zone, ramping up will be delayed until the animal(s) leaves the Level A harassment zone. Activity will begin only after the Wildlife Observer has determined, through sighting, that the animal(s) has moved outside the Level A harassment zone.
  - If a Steller sea lion, harbor seal, harbor porpoise, or killer whale is present in the Level B harassment zone, ramping up will begin and a Level B take will be documented. Ramping up will occur when these species are in the Level B harassment zone whether they entered the Level B zone from the Level A zone, or from outside the project area.
  - If any marine mammal other than Steller sea lions, harbor seals, harbor porpoises, or killer whales is present in the Level B harassment zone, ramping up will be delayed until the animal(s) leaves the zone. Ramping up will begin only after the Wildlife Observer has determined, through sighting, that the animal(s) has moved outside the harassment zone.
- During-Activity Monitoring:
  - Vibratory Pile Installation or removal (Level B at 1,150 meters)
    - Vibratory pile installation or removal will continue if a Steller sea lion, harbor seal, harbor porpoise, or killer whale enters the Level B harassment zone and a Level B take will be documented. If Level B take reaches the authorized limit, then vibratory pile installation will be stopped as these species approach to avoid additional take of these species.
    - Vibratory pile installation or removal will be stopped if a humpback whale, Dall's porpoise, gray whale, fin whale, or any other marine mammal for which take is not authorized approaches the Level B harassment zone.
  - Impact Pile Installation (Level B at 225 meters)
    - Impact pile installation will continue if a Steller sea lion, harbor seal, harbor porpoise, or killer whale enters the Level B harassment zone and a Level B

- take will be documented. If Level B take reaches the authorized limit, then impact pile installation will be stopped as these species approach to avoid additional take of these species.
- Impact pile installation will be stopped if a humpback whale, Dall's porpoise, gray whale, fin whale, or any other marine mammal for which take is not authorized approaches the Level B harassment zone.
  - Impact Pile Installation (with pile caps, Level A at 4 meters for pinnipeds and 15 meters for cetaceans)
    - Impact pile installation will be stopped if any species of marine mammal approaches the Level A harassment zone. If a Steller sea lion enters the Level A harassment zone before impact pile installation can be stopped, then a Level A take will be documented.
  - Down-hole Drilling (Level B at 3 meters)
    - Down-hole drilling will continue if a Steller sea lion, harbor seal, harbor porpoise, or killer whale enters the Level B harassment zone and a Level B take will be documented. If Level B take reaches the authorized limit, then down-hole drilling will be stopped as these species approach to avoid additional take of these species.
    - Down-hole drilling will be stopped if a humpback whale, Dall's porpoise, gray whale, fin whale, or any other marine mammal for which take is not authorized approaches the Level B harassment zone.
  - Post-Activity Monitoring:
    - Monitoring of the Level A and Level B harassment zones will continue for 20 minutes following the completion of the activity.

## 3.2 Wildlife Observer Qualifications

At a minimum, all Wildlife Observers must be capable of spotting and identifying marine mammals and documenting applicable data during all types of weather, including rain, sleet, snow, and wind. All Wildlife Observers must also be comfortable with handling the authority to stop work when necessary.

Qualifications will include:

- Visual acuity in both eyes (correction is permissible) sufficient to allow detection and identification of marine mammals at the water's surface. Use of binoculars may be necessary to correctly identify the target to species.
- Demonstrated ability to conduct field observations and collect data according to assigned protocols (this may include academic training).
- Ability to work in cold, wet weather, including sleet, wind, snow, and rain.
- Experience or training in field identification of marine mammals.

- Sufficient training, orientation, or experience with construction operations to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel about marine mammals observed in the area.
- Ability to collect the required marine mammal observation data as detailed in Section 3.3.

## 3.3 Data Collection

### 3.3.1 Environmental Conditions and Construction Activity

The Wildlife Observer will also document environmental conditions, types of construction activities, types of nearby commercial activities, and any communications with the construction crew in the environmental conditions and construction activities log. Environmental conditions will be documented at the beginning and end of every monitoring period and every half hour, or as conditions change. Any nearby commercial activities that could influence marine mammal behavior will be documented at the time of a marine mammal sighting. These could include presence and number of vessels offloading at the seafood processing facility dock, the number and type of vessels sailing by, and the number and type of vessels refueling at the neighboring dock. Data collected will also include the Wildlife Observers' names; location of the observation station; time of observation; wave height; wind speed; amount and position of glare; weather conditions; and visibility (Table 3-1).

The Wildlife Observer will document the time of startup or ramping up (Section 4.2) as well as shutdown. The reason for stopping work, time of shutdown, and type of pile driving or other in-water work taking place will also be documented. Additionally, all communications between an Wildlife Observer and the construction crew will be documented.

Data collected regarding environmental conditions, marine mammal sightings, and mitigation measures will be entered into a spreadsheet. Each data entry will be checked for quality assurance and quality control. Upon request, the data will be submitted to NMFS along with the final monitoring report.

### 3.3.2 Sightings

Each marine mammal sighting will be documented on a sighting form, which consists of a data page/table on the front and a map on the back (Attachment 1). Alternatively, data will be collected using a laptop, tablet or similar electronic device that is protected from wet weather. Regardless of the collection platform, data will consist of start and end times of each sighting; number of individuals; sex and age class, if possible; behavior and movement; distances from project activities to the sighting; type of in-water activity at the time of sighting; and whether and when project activities were stopped in response to the sighting (Table 3-1). Monitoring distances will be measured with range finders and marked with buoys as needed. To the extent practicable, the Wildlife Observers will record behavioral observations that may make it possible to determine if the same or different individuals are being "taken" as a result of project activities over the course of a single day. While monitoring and tracking a sighting, Wildlife Observers will also continue to sweep the water with binoculars and the naked eye to identify other marine mammals potentially entering the area. These data will be submitted to NMFS as part of the final monitoring report.

**Table 3-1. Data attributes and definitions**

<b>Data Attribute</b>	<b>Attribute Definition and Units Collected</b>
<b><i>Environmental Conditions</i></b>	
Weather conditions	Dominant weather conditions, collected every 30 minutes: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wind speed	In knots
Wind direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Wave height	Calm, ripples (up to 4 inches), small wavelets (up to 8 inches), large wavelets (up to 2 feet), small waves (up to 3 feet), moderate waves (up to 6 feet), large waves (up to 9 feet)
Cloud cover	Amount of cloud cover (0–100%)
Visibility	Maximum distance at which a marine mammal could be sighted
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, etc.)
Tide	Predicted hourly data information gathered from National Oceanic and Atmospheric Administration will be available on-site
<b><i>Construction and Communication Activities</i></b>	
Time of event	Time that construction activities and all communications between Wildlife Observers and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp up, startup, shutdown, and type of pile driving
Communication	Information communicated between Wildlife Observers and construction crew
<b><i>Marine Mammal Sighting Data</i></b>	
Time of initial and last sighting	Time the animals are initially and last sighted
Number of individuals	Minimum and maximum number of animals counted; record the count the Wildlife Observer believes to be the most accurate
Sex and age, if possible	Generally, numbers of females with pups or calves
Initial and final heading	Direction animals are headed when initially and last sighted
In-water construction activities at time of sighting	Type of construction activities occurring at time of sighting
Distance from marine mammal to construction activities	Distance from marine mammal to construction activities when initially sighted, closest approach to activities, and final sighting
Commercial activities at time of sighting	Description of nearby commercial activities occurring at time of sighting, such as presence and number of vessels offloading at seafood processing facility dock, number and type of vessels sailing by, number and type of vessels refueling at dock
Behavior	Behaviors observed, indicating the primary and secondary behaviors
Change in behavior	Changes in behavior; indicate and describe
Group cohesion	Orientation of animals within the group and the distance between animals

## 4.0 MITIGATION MEASURES

The DOTP&F proposes to employ mitigation measures to minimize the number of marine mammals potentially affected. Mitigation measures discussed here will include those that pertain to Level A and Level B harassment zones, and those that involve observation of marine mammals and actions designed specifically to minimize the number of marine mammal takes in the immediate project area.

### 4.1 Harassment Zones

Modeling results for Level A and Level B harassment zones discussed in Section 2.0 were used to develop mitigation measures for pile removal and installation. These include:

- During pile installation and removal, the shutdown zone shall include all areas where the underwater noise levels are anticipated to equal or exceed the Level A (injury) harassment criteria for Steller sea lions and harbor seals (190 dB rms isopleth) and for harbor porpoises and killer whales (180 dB rms isopleth). During all pile installation and removal activities, regardless of predicted noise levels, a conservative 4-meter (13-foot) shutdown zone will be in effect for Steller sea lions and harbor seals, and a conservative 15-meter (50-foot) shutdown zone will be in effect for harbor porpoises and killer whales.
- During impact pile installation, the Level B harassment zone shall extend to 225 meters for Steller sea lions, harbor seals, harbor porpoises, and killer whales. This 225-meter distance will serve as a shutdown zone for all other marine mammals (humpback whales, Dall's porpoises, gray whales, fin whales, or any other) to avoid Level B take. Level B take of humpback whales, Dall's porpoises, gray whales, and fin whales is not requested and will be avoided by shutting down before individuals of these species enter the Level B harassment zone.
- During vibratory pile installation and removal, the Level B harassment zone shall extend to 1,150 meters for Steller sea lions, harbor seals, harbor porpoises, and killer whales. This 1,150-meter distance will serve as a shutdown zone for all other marine mammals (humpback whales, Dall's porpoises, gray whales, fin whales, or any other) to avoid Level B take. Level B take of humpback whales, Dall's porpoises, gray whales, and fin whales is not requested and will be avoided by shutting down before individuals of these species enter the Level B harassment zone.
- The Level A and Level B harassment zones will be monitored throughout the time required to install or extract a pile. If a harbor seal, harbor porpoise, or killer whale is observed entering the Level B harassment zone, a Level B exposure will be recorded and behaviors documented. That pile segment will be completed without cessation, unless the animal approaches the Level A shutdown zone. Pile installation or extraction will be halted immediately before the animal enters the Level A zone. Level A take of harbor seals, harbor porpoises, and killer whales is not requested and will be avoided by shutting down before individuals of these species enter the Level A harassment zone.
- If a Steller sea lion, harbor seal, harbor porpoise, or killer whale is present in the Level B harassment zone, ramping up will begin and a Level B take will be documented. Ramping up will occur when these species are in the Level B harassment zone whether they entered the Level B zone from the Level A zone, or from outside the project area.

- If a Steller sea lion is observed entering the Level B harassment zone, a Level B exposure will be recorded and behaviors documented. That pile segment will be completed without cessation. If the individual approaches the Level A harassment zone, pile installation will be halted, to try to avoid Level A exposure. However, as discussed in the DOT&PF's IHA application, it is possible that Level A exposure of sea lions will occur, despite best efforts to avoid Level A exposure. If a Steller sea lion is observed entering the Level A harassment zone, shutdown will occur immediately, and a Level A exposure will be recorded and behaviors documented. Sea lion behaviors will be recorded at all times during monitoring.

## 4.2 Starting Up and Ramping Up

At the beginning of the work day or when pile installation or extraction activities have been stopped for longer than 30 minutes, ramping up procedures will be implemented. Ramping up generally involves starting the equipment for brief durations to provide marine mammals in the vicinity of a construction site with an audible warning of impending noise, giving them the opportunity to leave the area before noise reaches the threshold of disturbance.

Each day before in-water pile removal or installation begins, the Wildlife Observer will search the Level A and Level B harassment zones for 30 minutes to locate any marine mammals. If a marine mammal is present within the Level A harassment zone, ramping up will not begin. If a humpback whale, Dall's porpoise, gray whale, or fin whale, or other species for which Level B take is not authorized is present within the Level B harassment zone, ramping up will not begin. If a Steller sea lion, harbor seal, harbor porpoise, or killer whale is present within the Level B zone, ramping up will be authorized to begin and a Level B take will be recorded for each individual marine mammal.

For impact pile driving, ramping up will be accomplished by an initial set of three strikes, followed by a 30-second waiting period, and then followed by two subsequent three-strike sets. For vibratory pile installation or extraction, sound will be initiated for 15 seconds followed by a 1-minute waiting period; this will be repeated two subsequent times.

If pile-driving installation or extraction is stopped for more than 30 minutes, work may be started again after the above ramping-up procedures are followed.

Ongoing in-water pile removal or installation will be continued during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire Level B harassment zone, provided both the in-water noise-generating activity and marine mammal monitoring continues (acknowledging that monitoring will occur at a reduced level of effectiveness). A Wildlife Observer will continue to monitor the visible portion of the Level B harassment zone throughout the duration of activities producing in-water noise. Pile removal or installation will not be initiated or ramped up from a "shutdown condition" when the complete Level B harassment zone is not visible for a continuous 30-minute pre-operational monitoring period (whether due to darkness, low light, high sea state, fog, ice, heavy rain, glare, or other conditions). A shutdown condition is defined as a duration of 30 minutes or more when in-water noise from pile removal or installation does not occur.

## 4.3 Avoiding Level A take

During all pile installation and removal activities, regardless of predicted noise levels, a conservative 4-meter (13-foot) shutdown zone will be in effect for Steller sea lions and harbor

seals, and a conservative 15-meter (50-foot) shutdown zone will be in effect for harbor porpoises and killer whales. This mitigation measure will effectively avoid Level A take for all marine mammals, with the potential exception of Steller sea lions, which are abundant in the project area and are attracted to the neighboring seafood processing facility (see DOT&PF's IHA application). Any Level A take of Steller sea lions will be documented.

## 4.4 Other Mitigation Measures

Site visits to the Pier 1 area and discussions with local stakeholders have resulted in potential mitigation measures that require further consideration and assessment.

Currently, vessels making deliveries to the seafood processing plant tie up at the dock on their starboard sides, with their sterns to the northeast toward the Pier 1 dock. If delivering vessels were able to tie up on their port sides, with their sterns toward the southwest, away from Pier 1, the distance between the area of attraction for sea lions (the stern, where fish may be available) and Pier 1 would be reduced by the length of the vessel (up to 30.5 meters [100 feet] or more). Initial discussions with the seafood processing plant indicated that reversing the typical docking orientation of delivering vessels may be an option during the short periods of time when impact pile driving is planned. Further discussions and coordination are anticipated.

At certain busy times during the year, multiple vessels may wait in line for their turn to make fish deliveries to the processing plant. Often, the vessels "raft up" out from the processing plant dock by tying up to one another, port to starboard, into the channel. This additional activity and presence of multiple sources of food at once can increase the number of sea lions attracted to the processing plant and the Pier 1 area. If alternative dock space were available in another place, such as at Pier 2 or Oscar's Dock, both City of Kodiak-owned facilities, vessel captains may choose to tie up in a less-congested area, reducing the attraction of sea lions to the processing plant and Pier 1. Further discussions of this potential mitigation measure are also anticipated.

## 5.0 REPORTING

A draft report will be submitted to NMFS within 90 calendar days of the completion of marine mammal monitoring. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. To the extent practicable, the Wildlife Observers will record behavioral observations that may make it possible to determine if the same or different individuals are being “taken” as a result of project activities over the course of a single day.

In general, reporting will include:

- a. Numbers of days of observations
- b. Lengths of observation periods
- c. Locations of observation stations and dates used
- d. Numbers, species, dates, group sizes, and locations of marine mammals observed
- e. Descriptions of work activities, categorized by type of work taking place while marine mammals were being observed
- f. Distances to marine mammal sightings, including closest approach to construction activities
- g. Descriptions of any observable marine mammal behavior in the Level A and Level B harassment zones
- h. Actions performed to minimize impacts to marine mammals
- i. Times of shutdown events including when work was stopped and resumed due to the presence of marine mammals or other reasons
- j. Refined take estimates based on the numbers of Steller sea lions, harbor seals, harbor porpoises, and killer whales observed during the course of pile installation and removal activities
- k. Descriptions of the type and duration of any noise-generating work occurring and ramp-up procedures used while marine mammals were being observed
- l. Details of all shutdown events, and whether they were due to presence of marine mammals, inability to clear the hazard area due to low visibility, or other reasons
- m. Summary of counts at the Dog Bay float and surrounding areas that are being monitored by the alternate Wildlife Observer
- n. Summary of vessel activities at the adjacent seafood processing plant
- o. Tables, text, and maps to clarify observations

Full documentation of monitoring methods, an electronic copy of the data spreadsheet, and a summary of results will also be included in the report.

If a marine mammal stranding is observed, NMFS or the U.S. Fish and Wildlife Service will be contacted immediately through the Alaska Marine Mammal Stranding Hotline (1-877-925-7773).



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## **Attachment 1: Data Forms**



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### Marine Mammal Sighting Form

<b>Project:</b>	<b>Location:</b>	<b>Sighting #:</b>
<b>Date:</b>	<b>Observer(s):</b>	<small>(1st sighting of the day is Sighting#: 1)</small>

Time <small>(military)</small>		Species <small>(circle)</small>	Distance <small>(animal to activity)</small>		Number of Animals		Number of Animals in Each Class			
Initial Sighting Time		Steller Sea Lion	Initial Distance		Min Count		Adults		Calves/ Pups	
Final Sighting Time		Harbor Seal	Closest Distance		Max Count		Juveniles		Unkn. Age	
Time Entered H-Zone B		Harbor Porpoise								
Time Exited H-Zone B		Killer Whale	Final Distance		Best Count					
Time Entered H-Zone A		Sea Otter					Male		Female	
Time Exited H-Zone A		other: _____					Unknown Sex			

**Behavior of Marine Mammal** check all observed behaviors; place a 1 next to primary, 2 next to secondary activity):  
Indicate any changes in behavior in the Additional Information section

<input type="checkbox"/> Travel	<input type="checkbox"/> Fight	<input type="checkbox"/> Mill	Other: _____
<input type="checkbox"/> Disoriented	<input type="checkbox"/> Play	<input type="checkbox"/> Dive	
<input type="checkbox"/> Slap	<input type="checkbox"/> Spyhop	<input type="checkbox"/> Unknown	
<input type="checkbox"/> Feeding Observed	<input type="checkbox"/> Swimming Toward Site	<input type="checkbox"/> Swimming Away from Site	

Group Cohesion (Orientation of animals within the group and the approx. distance between animals) :

**Project Activities and Harassment Zone**

Entered Harassment Zone A? **Y or N**                      Entered Harassment Zone B? **Y or N**

In-Water Work was occurring at initial sighting? **Y or N**                      List In-water Activities: \_\_\_\_\_

SHUT DOWN or DELAYED from \_\_\_\_\_ to \_\_\_\_\_ (time)

NO SHUT DOWN, EXPLANATION REQUIRED :

Describe Commerical Activities (# and type of vessels offloading at sea food processing dock, traveling by, refueling at dock):

**Additional Information** (include more detailed information on behavior):

Draw locations on hardcopy map





Appendix B. Incidental Harassment Authorization for the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.



## INCIDENTAL HARASSMENT AUTHORIZATION

The Alaska Department of Transportation & Public Facilities (DOT&PF) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)), to harass marine mammals incidental to a pier reconstruction project in Kodiak, Alaska.

1. This Incidental Harassment Authorization (IHA) is valid from September 30, 2015 through September 29, 2016.
2. This Authorization is valid only for pile installation and removal activities associated with the Pier 1 Kodiak Ferry Terminal and Dock Improvements Project. Any reference to pile driving in this document is intended to refer to all pile installation and removal activities, unless otherwise stated.
3. General Conditions
  - (a) A copy of this IHA must be in the possession of DOT&PF, its designees, and work crew personnel operating under the authority of this IHA.
  - (b) The species authorized for taking are transient killer whale (*Orcinus orca*), western distinct population segment (wDPS) of Steller sea lion (*Eumetopias jubatus jubatus*), harbor porpoise (*Phocoena phocoena*), and harbor seal (*Phoca vitulina richardii*).
  - (c) Taking by Level B harassment is limited to the species listed in condition 3(b). See Table 1 (attached) for numbers of take authorized. Taking by Level A harassment is authorized only for the wDPS of Steller sea lion. See Table 1 (attached) for numbers of take authorized.
  - (d) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b), with the exception of the authorized Level A harassment of Steller sea lions, or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.
  - (e) DOT&PF shall conduct briefings between construction supervisors and crews, the marine mammal monitoring team, and DOT&PF staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.



- (f) DOT&PF may conduct a maximum of 120 days of in-water impact driving, vibratory driving, and down-the-hole drilling.

4. Mitigation Measures

The holder of this Authorization is required to implement the following mitigation measures:

- (a) For all pile driving, DOT&PF shall implement shutdown zones as defined in Table 2 (attached). If a marine mammal comes within or approaches the relevant shutdown zone, such operations shall cease. This measure is not applicable to Steller sea lions, unless the authorized amount of takes by Level A harassment (see Table 1) is reached.
- (b) DOT&PF shall similarly avoid direct interaction with marine mammals during in-water heavy machinery work other than pile driving that may occur in association with the specified activities. If a marine mammal comes within 10 m of such activity, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions, as appropriate.
- (c) The DOT&PF shall establish monitoring locations as described below. Please also refer to the Monitoring Plan (Monitoring Plan; attached).
  - (i) For all pile driving activities, a minimum of one observer shall be stationed at Pier 1 work site in order to monitor the shutdown zones.
  - (ii) For all pile driving activities, a minimum of one additional observer shall be positioned on Near Island or in a location providing optimal monitoring of the project site and surrounding waters.
  - (iii) These observers shall record all observations of marine mammals, regardless of distance from the pile being driven, as well as behavior and potential behavioral reactions of the animals. Observers shall scan the waters within each monitoring zone activity using binoculars (Vector 10X42 or equivalent), spotting scopes (Swarovski 20-60 zoom or equivalent), and visual observation.
  - (iv) If waters exceed a sea-state which restricts observers' ability to make observations within the shutdown zone (e.g. excessive wind or fog), impact pile installation shall cease until conditions allow the resumption of monitoring.
- (d) Monitoring shall take place from thirty minutes prior to initiation of pile driving activity through thirty minutes post-completion of pile driving activity. Pre-activity monitoring shall be conducted for thirty minutes to ensure that the shutdown zone is clear of marine mammals (other than Steller sea lion), and pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals (other than Steller sea lion) in the shutdown zone, animals shall

be allowed to remain in the shutdown zone (i.e., must leave of their own volition) and their behavior shall be monitored and documented. Monitoring shall occur throughout the time required to drive a pile. The shutdown zone must be determined to be clear during periods of good visibility (i.e., the entire shutdown zone and surrounding waters must be visible to the naked eye).

- (e) If a marine mammal (other than Steller sea lion) approaches or enters the shutdown zone, all pile driving activities at that location shall be halted. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone, or fifteen minutes (small odontocetes and pinnipeds) or thirty minutes (medium-sized whales, including killer whales), as appropriate, have passed without re-detection of the animal.
- (f) Monitoring shall be conducted by qualified observers, as described in 5(b) below. Trained observers shall be placed from the best vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures when applicable through communication with the equipment operator.
- (g) DOT&PF shall use soft start techniques recommended by NMFS for vibratory and impact pile driving. Soft start for vibratory drivers requires contractors to initiate sound for fifteen seconds at reduced energy followed by a one-minute waiting period. This procedure is repeated two additional times. Soft start for impact drivers requires contractors to provide an initial set of strikes at reduced energy, followed by a one-minute waiting period, then two subsequent reduced energy strike sets. Soft start shall be implemented at the start of each day's pile driving and at any time following cessation of pile driving for a period of thirty minutes or longer. Soft start for impact drivers must be implemented at any time following cessation of impact driving for a period of thirty minutes or longer.
- (h) Pile cushions shall be used during all impact pile-driving activities.
- (i) For all in-water pile driving activities, DOT&PF shall operate up to a maximum of 10 hours per day.

## 5. Monitoring

The holder of this Authorization is required to conduct marine mammal monitoring during pile driving activity. Monitoring and reporting shall be conducted in accordance with the Monitoring Plan.

- (a) During all in-water pile driving activities, DOT&PF shall establish monitoring zones as described in Table 2 (attached). DOT&PF shall collect sighting data and behavioral responses to pile driving for marine mammal species observed in the region of activity during the period of activity.
- (b) Observers shall meet the following minimum qualifications:
  - (i) Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to

estimate target size and distance; use of binoculars may be necessary to correctly identify the target.

- (ii) Education, training, or suitable combination thereof in biological science, wildlife management, mammalogy or related fields. Observers should have field experience in identification and behavior of marine mammals and project-specific training.
  - (iii) Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
  - (iv) Experience or training in the field identification of marine mammals, including the identification of behaviors.
  - (v) Experience or training in protocols to communicate with contractors and operators, including shut down procedures.
  - (vi) Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.
  - (vii) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
  - (viii) Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior.
  - (ix) Have no other project-related responsibility other than marine mammal monitoring, documentation, and reporting during observation periods.
  - (x) Must read and understand the monitoring plan and the IHA, agree to enforce the conditions presented therein, be able to coordinate and communicate with other personnel, and identify and report incidental harassment of marine mammals.
- (c) For all marine mammal monitoring, information shall be recorded using approved data forms.
- (d) If any non-authorized marine mammal enters into the disturbance zone as described in Table 2, all in-water pile driving activities must shut down.
- (e) If any non-authorized marine mammal is present in the disturbance zone as described in Table 2, ramping up will be delayed until the animal(s) leaves the zone. Ramping up will begin only after the observer has determined, through sighting, that the animal(s) has moved outside the disturbance zone.

6. Reporting

The holder of this Authorization is required to:

- (a) Submit a draft report on all monitoring conducted under the IHA within ninety calendar days of the completion of marine mammal monitoring. A final report shall be prepared and submitted within thirty days following resolution of comments on the draft report from NMFS. This report must contain the following informational elements:
  - (i) Detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any.
  - (ii) Information regarding attempts to distinguish between the number of individual animals taken and the number of incidents of take.
  - (iii) The following information, to be collected on the data forms:
    1. Date and time that monitored activity begins or ends;
    2. Construction activities occurring during each observation period;
    3. Weather parameters (e.g., percent cover, visibility);
    4. Water conditions (e.g., sea state, tide state);
    5. Species, numbers, and, if possible, sex and age class of marine mammals;
    6. Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
    7. Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
    8. Locations of all marine mammal observations; and
    9. Other human activity in the area.
- (b) Reporting injured or dead marine mammals:
  - (i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as: an injury (Level A harassment to animals other than Steller sea lions), serious injury, or mortality, DOT&PF shall immediately cease the specified activities and report the incident to the Office of Protected Resources

(301-427-8408), NMFS, and the Alaska Regional Stranding Coordinator (Aleria Jensen, 907-586-7248), NMFS. The report must include the following information:

1. Time and date of the incident;
2. Description of the incident;
3. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
4. Description of all marine mammal observations in the 24 hours preceding the incident;
5. Species identification or description of the animal(s) involved;
6. Fate of the animal(s); and
7. Photographs or video footage of the animal(s).

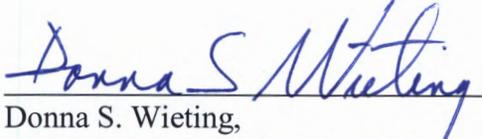
Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with DOT&PF to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. DOT&PF may not resume their activities until notified by NMFS.

- (ii) In the event that DOT&PF discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), DOT&PF shall immediately report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS.

The report must include the same information identified in 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with DOT&PF to determine whether additional mitigation measures or modifications to the activities are appropriate.

- (iii) In the event that DOT&PF discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), DOT&PF shall report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. DOT&PF shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.



Donna S. Wieting,  
Director, Office of Protected Resources,  
National Marine Fisheries Service.

SEP 30 2015

Date

**Table 1. Authorized take numbers, by species.**

Species	Authorized Level A Takes	Authorized Level B Takes	Total Authorized Takes
Killer Whale ( <i>Orcinus orca</i> ) <i>Eastern N. Pacific, Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stock</i>	0	48	48
Harbor Porpoise ( <i>Phocoena phocoena</i> ) <i>Gulf of Alaska Stock</i>	0	40	40
Steller Sea Lion ( <i>Eumetopias jubatus</i> ) <i>wDPS Stock</i>	30	3,260	3,290
Harbor Seal ( <i>Phoca vitulina richardii</i> ) <i>South Kodiak Stock</i>	0	40	40

**Table 2. Minimum radial distance to Shutdown and Disturbance Zones**

Activity	Distance to threshold in meters		
	Shutdown, pinnipeds	Shutdown, cetaceans	Disturbance zone
Impact driving, steel piles	4	20	350
Vibratory driving, steel piles	n/a	n/a	1,150
DTH drilling	n/a	n/a	300

Appendix C. USFWS Letter of Concurrence for the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.



# United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE  
Anchorage Fish and Wildlife Field Office  
4700 BLM Road  
Anchorage, Alaska 99507



In Reply Refer To:  
FWS/AFES/AFWFO

September 3, 2015

**EMAILED TO:**

Ms. Jane Gendron  
Southcoast Region Environmental Manager  
Alaska Department of Transportation and Public Facilities  
6860 Glacier Highway  
Juneau, Alaska 99801

Re: Kodiak Ferry Terminal and Dock Improvements Project (*Consultation # 2015-I-0075*)

Dear Ms. Gendron:

Thank you for your letter dated August 14, 2015, requesting re-initiation of the Kodiak ferry terminal and dock improvement project in Kodiak, Alaska. The proposed project has the potential to affect the federally threatened Southwest Alaska Distinct Population Segment of the northern sea otter (*Enhydra lutris kenyoni*: sea otter), Steller's eider (*Polysticta stelleri*), and federally designated sea otter critical habitat. Our comments are provided in accordance with Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*, as amended; ESA).

Alaska Department of Transportation and Public Facilities (DOT&PF) first initiated consultation with the U.S. Fish and Wildlife Service (Service) on this proposed project in 2013. In a letter dated June 26, 2013, the Service concurred with DOT&PF's determination that the proposed project may affect, but is not likely to adversely affect Steller's eider, and sea otters or their designated critical habitat; DOT&PF proposed to implement the 2012 avoidance and observer protocols for pile driving, dredging, and placement of fill developed by the Service to avoid take of sea otters and eiders (Service 2012). However, site visits revealed unexpected sea otter occupation of nearshore habitat in proximity to the proposed project. The DOT&PF was concerned the sea otter presence could lead to extended shut-downs. To avoid potential shut-downs, DOT&PF proposed a modified, behavior based avoidance and minimization measures for the sea otter and requested Service concurrence based on those protocols; the Service had some concerns with the behavioral based monitoring protocols and responded with a non-concurrence letter on July 1, 2015. On July 29, 2015, Service employees met with DOT&PF staff and their consultants to discuss minimization measures for sea otters that are acceptable to both parties.

As reflected in your August 14, 2015, reinitiation request, the DOT&PF once again proposes to implement the minimization measures described in the draft 2012 avoidance and observer protocols for pile driving, dredging, and placement of fill developed by the Service to avoid take of sea otters (Service 2012). The Service concurs with DOT&PF's determination that the proposed Kodiak ferry terminal and dock improvement project may affect, but is not likely to adversely affect the sea otter. Should sea otters remain in the hazard area, resulting in numerous shut downs, DOT&PF will contact the Service to discuss initiating additional protection measures.

Thank you for your cooperation in meeting our joint responsibilities under the ESA. If you have any questions, please contact Erin Knoll, Fish and Wildlife Biologist, at (907) 271-3063 or [erin\\_knoll@fws.gov](mailto:erin_knoll@fws.gov).

Sincerely,



Ellen W. Lance  
Ecological Service Branch Chief

CC:

Al Fletcher, Federal Highways Administration, [Al.fletch@dot.gov](mailto:Al.fletch@dot.gov)

John Mitzel, USACE, [Andy.mitzel@usace.army.mil](mailto:Andy.mitzel@usace.army.mil)

Jill Taylor, DOT&PF, [jill.taylor@alaska.gov](mailto:jill.taylor@alaska.gov)

Literature Cited:

U.S. Fish and Wildlife Service (Service). 2012. Observer Protocols for Pile Driving, Dredging and Placement of Fill. Anchorage Fish and Wildlife Field Office. Draft August 7, 2012.

Appendix D. Photographs showing observer viewing areas, sample Dog Bay float counts, and typical interaction between Steller sea lions and a marine vessel.



Near Island observation site looking northeast



Pier One alternate observation site looking southwest



Fullers boat yard looking west



Dog Bay float photo used for counting Steller sea lion taken from the Near Island hill observation site



Typical Steller sea lion interaction with marine vessel



Killer whales seen on 2 March

Appendix E. Behavior codes used for sightings of protected species during the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.

Behavior	Definition	Disturbance Behavior? <sup>a</sup>
Travel	Moving between one location and another.	no
Slap	Vigorously slaps surface of the water with body, flippers, tail, or other body part.	no
Breach	Leaps clear of the water.	no
Feeding	Observer witnessed feeding behavior; not inferred.	no
Fight	Agonistic interactions between 2 or more individuals.	no
Play	Behavior that does not seem to be directed towards a particular goal; may involve 1 or >1 individuals.	no
Porpoise	Moving rapidly with body breaking the surface.	no
Spyhop	Rises vertically to look above the water.	no
Swimming toward site	Moving toward the construction site and is at risk of entering the shutdown zones.	no
Mill	Moving about without an obvious line of travel; may be looking around without an obvious motive.	no
Dive	Dove just after it was observed.	no
On land	Observed on land, not in the water.	no
Enter	Enters the water from land, boat, or man-made structure.	no
Resting	Resting (e.g. floating on its back) in the water.	no
Alert	Displayed increased awareness of a potential threat in the area and is assessing the situation, but not fleeing.	yes
Fleeing	Rapidly departing a location due to a disturbance.	yes
Disoriented	Moving erratically and not in a clear direction and/or behavior has shifted from having a clear pattern to an unclear pattern.	yes
Swimming away from site	Moving away from the construction site. The rate at which they are moving away from the site or their posture indicates they are trying to move away from construction activity, but may have remained in the area if construction activity were not taking place.	yes
Unknown	Not observed long enough to discern a behavior.	no
Other	Behavior not included in defined behavior code list; requires an explanation in the “notes” field	no

<sup>a</sup> Disturbance behaviors indicate possible reaction to an event that causes the animal to react in a way it probably would not have if the event had not occurred.

Appendix F. Protocol for communications between PSOs and construction team.



## Communication Protocols for Alaska Biological Research Inc. Protected Species Observers

### 07:00 Morning Muster

While in Kodiak, AK, Protected Species Observer's (PSO) are expected to muster on-site regardless of the days planned activities. The DOT&PF Project Engineer will coordinate the time and place for morning meetings. PSO's will **bring all personal protective equipment** required for the day's operations.

If PSO's cannot meet the minimum observation qualifications (*IHA Section 5(b)(i)*), or cannot work due to illness, ABR Inc. will notify the Project Engineer immediately.

### Radio Communication Protocol

Primary and secondary observers will maintain radio communication with the DOT&PF at all times during pile activity. To minimize radio chatter, and increase the effectiveness of two-way communications, please use the following:

- Default FRS Radio Channel – 9.0
  - **SENDER** – (Sender's Name), TO (Receiver's Name);
  - **RECIEVER** – GO FOR (Receiver's Name);
  - **SENDER** – State the message clearly and concisely, e.g. "Sea lion entering level B zone, north end of channel";
  - **RECIEVER** – Repeat the message back;
  - **SENDER** - Correct or Confirm the message;
  - **RECIEVER** – State the action taken, e.g. "Monitoring north end for sea lion".

### Shutdown Communication Protocol

The PSO's will maintain visual observation of the shutdown zone during all pile activity. To mitigate shutdowns and avoid unnecessary Level A Takes, PSO's will notify DOT&PF as soon as marine mammals are identified in proximity to the shutdown zone.

#### Unauthorized Marine Mammal Entering Relevant Shutdown Zone:

- Notify the DOT&PF on-site representative immediately:
  - **RADIO COMMUNICATION (if not within sight distance)**– Use the protocols described above;



- **HAND SIGNAL** -
- DOT&PF will initiate the shutdown with the Contractor's representative in charge of hand signaling the equipment operator.

Appendix G. Daily monitoring effort, weather, and sea conditions, Kodiak Ferry Terminal and Dock improvement project, Kodiak, AK, November 2015–June 2016.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
11/10/2015	12:05 to 13:37	near island	none	10	large wavelets	1:47	no
	12:11 to 13:27	pier one	none	10	small wavelets	1:53	no
11/11/2015	15:37 to 16:40	near island	none	10	calm to moderate waves	5:07	no
11/12/2015	14:19 to 14:57	pier one	none	10	calm	3:19	no
	14:22 to 15:26	near island	none	10	calm to small wavelets	3:22	no
	15:12 to 15:35	pier one	none	10	large wavelets	4:12	no
11/13/2015	13:57 to 15:46	near island	none	10	calm to large wavelets	2:09	no
11/13/2015	14:00 to 15:40	pier one	none	10	calm to small wavelets	2:12	no
11/14/2015	07:52 to 12:27	pier one	none	5 to 10	calm to small wavelets	-4:32	yes
	08:15 to 13:58	near island	none	3 to 10	calm to small wavelets	-4:09	yes
	12:52 to 15:14	pier one	none	10	calm	0:28	yes
	14:10 to 15:15	near island	none	10	calm	1:46	yes
11/16/2015	14:33 to 16:26	pier one	none	10	calm	0:45	no
	14:34 to 16:00	near island	none	10	calm	0:46	f
11/17/2015	08:45 to 11:24	pier one	none	10	large wavelets	-5:39	yes
	08:47 to 11:23	near island	none	10	small wavelets to large wavelets	-5:37	yes
11/18/2015	11:50 to 12:50	near island	none	10	calm	-3:40	no
	11:51 to 12:56	pier one	none	10	calm	-3:39	no
11/19/2015	11:39 to 11:44	near island	light rain	10	small wavelets	-4:33	no
	14:23 to 14:58	near island	light rain	1.5 to 3	small wavelets to large wavelets	-1:49	no
11/20/2015	09:35 to 10:47	near island	light rain	2 to 4	calm	4:47	no
11/21/2015	14:35 to 15:41	near island	none to light snow	10	large wavelets	-4:07	no
11/23/2015	14:42 to 15:49	near island	none	6 to 8	small wavelets	-5:42	no
11/24/2015	10:56 to 11:58	near island	heavy rain	1 to 1.5	small wavelets to large wavelets	1:44	no
11/25/2015	14:36 to 15:37	near island	heavy rain	1	calm	4:30	no
11/28/2015	13:03 to 14:03	near island	heavy rain	8 to 10	calm	0:39	no
11/30/2015	13:27 to 14:28	near island	heavy rain	1 to 1.5	large wavelets	-0:27	no
	13:34 to 14:39	pier one	heavy rain	1	small waves	-0:20	no
12/1/2015	14:28 to 15:44	pier one	heavy rain	1.5 to 3	large wavelets	-0:14	no
	14:34 to 14:35	near island	heavy rain	1	calm	-0:08	no
	14:45 to 15:45	near island	heavy rain	1	calm	0:03	no

## Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
12/2/2015	14:04 to 15:11	pier one	none	10	calm	-1:38	no
	14:08 to 15:10	near island	none	10	calm	-1:34	no
12/3/2015	10:28 to 11:34	pier one	none	10	calm	-6:14	no
	10:29 to 11:34	near island	none	10	calm	-6:13	no
12/4/2015	10:36 to 11:47	near island	none	10	calm	5:54	no
	10:37 to 11:39	fullers	none	10	calm to small wavelets	5:55	no
	13:57 to 16:10	near island	none	7 to 10	calm	-3:39	yes
	14:05 to 16:08	fullers	none	8 to 10	calm	-3:31	yes
12/5/2015	10:30 to 16:27	near island	none to light rain	3 to 10	calm to small wavelets	4:30	yes
	10:32 to 16:31	fullers	none to light rain	5 to 10	calm to small waves	4:32	yes
12/7/2015	13:23 to 14:26	fullers	light rain	1 to 10	calm to small wavelets	5:11	no
	13:24 to 14:30	near island	light rain	10	calm to small wavelets	5:12	no
12/8/2015	12:38 to 13:39	near island	heavy rain	1	small wavelets	3:32	no
12/14/2015	10:30 to 13:02	fullers	none	10	calm	-2:06	yes
	11:02 to 15	near island	none to heavy snow	2 to 10	calm to small wavelets	-1:34	yes
	13:31 to 15:03	fullers	none to heavy snow	5 to 10	calm	0:55	yes
12/15/2015	09 to 14	fullers	none	0.5 to 10	calm to large wavelets	-4:42	yes
	09 to 17:30	near island	none	0.5 to 10	calm to large wavelets	-4:42	yes
	14:08 to 17:30	fullers	none	3 to 10	calm	0:26	yes
12/16/2015	09:10 to 12:02	near island	light rain to heavy rain	0.1 to 6	large wavelets to small waves	-5:14	yes
12/16/2015	09:15 to 12	fullers	light rain	0.1 to 1.5	calm to small waves	-5:09	yes
12/17/2015	07:52 to 15:01	pier one	light rain to light snow	0.1 to 5	calm to small wavelets	5:58	yes
	09 to 17:16	near island	light rain to light snow	0.1 to 10	calm to small waves	-6:06	yes
	15:01 to 16:03	pier one alt.	light rain	5	small wavelets	-0:05	no
	16:19 to 17:16	pier one	light rain	10	calm	1:13	yes

## Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
12/18/2015	12:45 to 16:37	fullers	light rain to heavy rain	1.5 to 7	calm to small wavelets	-3:03	no
	12:45 to 17:02	near island	light rain to heavy rain	0.5 to 10	calm to small wavelets	-3:03	no
12/19/2015	09:00 to 12:40	near island	light rain	1 to 6	small waves to moderate waves	4:48	yes
	09:00 to 12:46	fullers	light rain	1 to 10	small wavelets to small waves	4:48	yes
1/4/2016	13:52 to 15:01	near island	drizzle	5 to 10	calm	-4:20	no
	13:52 to 15:01	pier one	drizzle	3 to 7	calm	-4:20	no
1/5/2016	09:00 to 17:24	near island	none	3 to 10	calm to small waves	1:36	yes
	09:11 to 15:07	pier one	none	2 to 10	calm to small wavelets	1:47	yes
	15:12 to 17:22	pier one	none	10	calm	-4	yes
1/6/2016	09:00 to 14:29	near island	none	0.5 to 10	calm	0:30	yes
	09:02 to 13:14	pier one	none	0.4 to 10	calm	0:32	yes
1/6/2016	13:44 to 14:30	pier one	none	10	calm	5:14	yes
1/7/2016	09:58 to 14:47	near island	none to fog	2 to 10	calm to small wavelets	0:34	no
	09:58 to 14:47	pier one	none to fog	0.8 to 10	calm to small wavelets	0:34	no
1/8/2016	09:33 to 12:37	near island	fog	0.8 to 3	large wavelets to small waves	-0:39	no
	09:34 to 13	pier one	none to fog	1 to 3	large wavelets to small waves	-0:38	no
1/8/2016	12:41 to 14:06	near island	none	1.5 to 3	large wavelets to small waves	2:29	no
	13:00 to 14:06	pier one	none to fog	0.7 to 2	large wavelets to small waves	2:48	no
1/9/2016	09:00 to 11:23	pier one	none to light rain	0.1 to 3	calm to small wavelets	-1:42	yes
	09:04 to 11:27	near island	none to fog	0.1 to 10	calm	-1:38	yes
1/11/2016	14:55 to 15:55	near island	none	10	calm	3:07	no
1/13/2016	11:10 to 12:43	near island	none	10	calm	-1:56	yes
1/18/2016	11:59 to 16:26	pier one	none to heavy rain	5 to 10	calm	-5:25	yes
	12:01 to 16:28	near island	none to heavy rain	5 to 10	calm	-5:23	yes

## Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
1/19/2016	14:55 to 17:41	pier one	light rain	3 to 6	calm	-3:47	yes
	15:05 to 17:40	near island	light rain to heavy rain	1.5 to 6	calm to small wavelets	-3:37	yes
1/20/2016	09:20 to 16:07	near island	none to heavy rain	4 to 10	calm to small wavelets	1:14	yes
	09:21 to 16:06	pier one	none to light rain	3 to 10	calm	1:15	yes
1/21/2016	08:47 to 09:43	pier one	light rain to heavy rain	0.3 to 1.5	large wavelets to small waves	-0:19	no
	08:52 to 09:45	near island	light rain	0.3 to 4	large wavelets to small waves	-0:14	no
1/22/2016	08:59 to 13:32	near island	none to light rain	1 to 10	calm to large wavelets	-0:55	yes
	08:59 to 13:33	pier one	none to light rain	3 to 10	calm to large wavelets	-0:55	yes
	13:59 to 14:51	pier one	none	10	calm	4:05	yes
	14:00 to 17:12	near island	none to heavy rain	10	calm to small wavelets	4:06	yes
	15:06 to 17:11	pier one	none to light rain	8 to 10	calm to small wavelets	5:12	yes
1/23/2016	09:23 to 14:58	pier one	none to heavy rain	3 to 10	calm to large wavelets	-1:07	yes
	09:28 to 14:58	near island	none to heavy rain	1 to 10	calm to large wavelets	-1:02	yes
1/25/2016	08:54 to 17:53	pier one	none to heavy rain	0.5 to 8	calm to large wavelets	-3	yes
	09:01 to 17:53	near island	light rain to heavy rain	0.5 to 6	calm to large wavelets	-2:53	yes
1/26/2016	08:56 to 17:15	pier one	none to heavy rain	0.5 to 10	calm to small wavelets	-3:28	yes
	08:59 to 10:46	near island	none to light rain	0.5 to 10	calm	-3:25	yes
	10:47 to 11:22	pier one alt.	none	10	calm	-1:37	yes
	11:22 to 17:17	near island	none to light rain	5 to 10	calm to small wavelets	-1:02	yes
1/27/2016	08:53 to 17:05	near island	none to light rain	0.5 to 10	calm to small wavelets	-4:07	yes
	08:59 to 13:34	pier one	none to fog	1 to 10	calm to small wavelets	-4:01	yes
	13:38 to 17:09	pier one	none to light rain	5 to 10	calm	0:38	yes

## Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
1/28/2016	08:56 to 17:55	pier one	none	0.5 to 10	calm to small wavelets	-4:28	yes
	08:56 to 17:56	near island	none	3 to 10	calm to small wavelets	-4:28	yes
1/29/2016	08:40 to 17:43	pier one	none	6 to 10	calm	-5:26	yes
	08:42 to 17:43	near island	none	5 to 10	calm to small wavelets	-5:24	yes
1/30/2016	08:35 to 17:02	pier one	none	0.5 to 10	calm to small wavelets	-6:01	yes
	08:41 to 17	near island	none	0.5 to 10	calm to small wavelets	-5:55	yes
2/1/2016	09:55 to 13:17	near island	none	8 to 10	calm	5:13	yes
	09:58 to 12:15	pier one	none	5 to 10	calm	5:16	yes
	13:17 to 14:23	pier one	none to light rain	5 to 8	calm	-3:55	no
2/3/2016	16:09 to 17:16	pier one	light rain	7	calm	-2:33	no
	16:13 to 17:15	near island	light rain	5	small wavelets	-2:29	no
2/4/2016	15 to 16:01	fullers	light rain	6	small waves	-4:30	no
	15:02 to 16:05	near island	light rain	5	calm	-4:28	no
2/5/2016	10:44 to 11:50	fullers	none	10	calm	1:56	no
	10:48 to 11:49	near island	none	10	small wavelets	2	no
2/6/2016	16:05 to 17:11	fullers	none	10	calm	-5:01	no
	16:10 to 17:10	near island	none	10	calm	-4:56	no
2/8/2016	16:05 to 17:11	fullers	light rain to heavy rain	7	calm	5:11	no
	16:08 to 17:10	near island	light rain	5	calm	5:14	no
2/9/2016	16:05 to 17:08	fullers	light rain	6 to 10	small wavelets	4:41	no
	16:07 to 17:07	near island	none to light rain	8 to 9	small wavelets	4:43	no
2/10/2016	14:59 to 16:02	fullers	none	10	small wavelets	2:47	no
	15 to 16:01	near island	none	10	calm	2:48	no
2/11/2016	14:58 to 17:16	pier one	none to light rain	3 to 7	calm to small wavelets	2:16	yes
	15 to 17:13	near island	none to light rain	10	calm	2:18	yes
2/12/2016	08:39 to 14:37	pier one	none to light snow	5 to 10	calm	-4:39	yes
	08:40 to 14:40	near island	none to light rain	3 to 10	calm to small wavelets	-4:38	yes
2/13/2016	16:22 to 17	fullers	light rain	3	large wavelets	2:22	no
	16:22 to 17	near island	light rain	7 to 8	small wavelets	2:22	no

Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
2/16/2016	16:03 to 17:03	near island	none	10	calm	-1:03	no
	16:03 to 17:08	pier one alt.		10	calm	-01:03	f
2/17/2016	11:09 to 16:16	pier one alt.	light rain to light snow	1.5 to 8	calm to small wavelets	4:21	no
	11:10 to 16:35	near island	light rain to heavy rain	2 to 5	calm to small wavelets	4:22	no
2/18/2016	09:58 to 16:50	pier one alt.	none to light rain	2 to 10	calm to small wavelets	1:40	yes
	10:01 to 16:39	near island	none to light snow	3 to 9	calm to small wavelets	1:43	yes
2/19/2016	08 to 09:58	pier one alt.	light rain to heavy snow	2 to 7	calm to small wavelets	-0:48	yes
	08:08 to 15:29	near island	none to light snow	2 to 10	calm to small wavelets	-0:40	yes
	10:04 to 15:28	pier one alt.	none to light snow	2 to 10	calm	1:16	yes
2/20/2016	16 to 17	pier one alt.	none	10	calm	-5:18	no
	16:03 to 17:05	near island	none	5 to 7	calm	-5:15	no
2/21/2016	07:30 to 08	fullers	none	1.3	calm	-2:48	no
	07:30 to 13:09	near island	none to light rain	0.25 to 10	calm	-2:48	yes
	08 to 12:38	pier one alt.	none to light snow	3 to 8	calm	-2:18	yes
2/22/2016	12:38 to 13:09	fullers	light rain	7	calm	2:20	no
	16:42 to 17:43	pier one alt.	none	10	calm	-5:54	no
2/23/2016	16:44 to 17:44	near island	none	7	calm	-5:52	no
	11:04 to 12:40	pier one alt.	light rain	5	large wavelets	-0:26	yes
2/24/2016	11:07 to 12:41	near island	light rain to heavy rain	2 to 3	large wavelets to small waves	-0:23	yes
	08:28 to 14:32	pier one alt.	none to light rain	5 to 8	calm	-3:26	yes
2/24/2016	08:28 to 18:11	near island	none to heavy rain	3 to 10	calm	-3:26	yes
	14:31 to 14:41	fullers	none	5	calm	2:37	yes
2/25/2016	14:40 to 18:11	pier one alt.	none	5 to 10	calm	2:46	yes
	08:35 to 18	pier one alt.	none to heavy rain	2 to 10	calm	-3:43	yes
2/25/2016	08:36 to 18	near island	none to heavy rain	3 to 8	calm to small wavelets	-3:42	yes

## Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
2/26/2016	08:30 to 18:56	pier one alt.	none to heavy rain	2 to 9	calm to large wavelets	-4:24	yes
	08:34 to 18:58	near island	none to heavy rain	2 to 8	calm to large wavelets	-4:20	yes
2/27/2016	08 to 14:04	pier one alt.	light rain to heavy rain	2 to 5	small wavelets to small waves	-5:18	yes
	08:01 to 09:33	near island	light rain to heavy rain	3 to 4	large wavelets	-5:17	no
	09:33 to 12:30	near island alt.	light rain to heavy rain	3 to 6	large wavelets	-3:45	yes
	12:30 to 13:56	near island	light rain	3 to 6	large wavelets	-0:48	yes
	14:04 to 14:32	fullers	heavy rain	2	small waves	0:46	no
	14:06 to 17	near island alt.	light rain to heavy rain	2 to 4	calm to large wavelets	0:48	yes
	14:32 to 17:01	pier one alt.	light rain to heavy rain	2 to 6	large wavelets to small waves	1:14	yes
2/28/2016	08:36 to 16	pier one alt.	none to light rain	8 to 10	calm to small wavelets	-5:18	yes
	08:38 to 16	near island	none to light rain	5 to 10	calm to large wavelets	-5:16	yes
2/29/2016	08:04 to 16:51	pier one alt.	none to light rain	7 to 10	small wavelets to large wavelets	5:52	yes
	08:05 to 16:52	near island	none to light rain	6 to 10	calm to small waves	5:53	yes
3/1/2016	08:15 to 08:45	pier one alt.	none	10	calm	4:45	no
	08:21 to 13:45	near island	none	10	calm	4:51	yes
	08:50 to 16:51	pier one alt.	none	10	calm	5:20	yes
	13:49 to 16:50	near island	none	10	calm	-0:47	yes
3/2/2016	08 to 13:33	near island	none to light rain	5 to 10	calm	3:42	yes
	08 to 17	pier one alt.	none to light rain	7 to 10	calm	3:42	yes
	14:15 to 16:51	near island	none to light rain	4 to 8	calm to small wavelets	-1:51	yes
3/3/2016	10:29 to 11:32	pier one alt.	none	10	calm	4:35	no
	10:30 to 11:31	near island	none	10	calm	4:36	no
	16:26 to 17:48	near island	none	10	calm	-0:52	yes
	16:50 to 17:51	pier one alt.	none	10	calm to small wavelets	-0:28	yes

Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
3/4/2016	08:04 to 18:51	pier one alt.	none to heavy snow	0.5 to 6	calm to small wavelets	0:40	yes
	08:12 to 18:49	near island	none to heavy snow	0.8 to 10	calm to moderate waves	0:48	yes
3/5/2016	07:34 to 17:10	pier one alt.	none to light snow	2 to 10	calm	-0:38	yes
	07:40 to 17:10	near island	none to light rain	1.5 to 10	calm to large waves	-0:32	yes
3/6/2016	07:33 to 17:51	near island	light rain to heavy rain	1 to 6	calm to small wavelets	-1:33	yes
	07:33 to 17:51	pier one alt.	light rain to heavy rain	0.5 to 6	calm	-1:33	yes
3/7/2016	07:26 to 17:49	pier one alt.	none to light rain	0.7 to 10	calm	-2:10	yes
	07:31 to 17:44	near island	none to light rain	2 to 10	calm	-2:05	yes
3/8/2016	07:48 to 12:23	pier one alt.	none	8 to 10	calm	-2:30	yes
	08:05 to 13:11	near island	none to light snow	1 to 10	calm	-2:13	yes
	12:28 to 13:11	pier one alt.	none	10	calm	2:10	no
	15:31 to 17:48	pier one alt.	none	10	calm	5:13	yes
	15:31 to 17:50	near island	none	10	calm	5:13	yes
3/9/2016	07:15 to 12:48	near island	none to heavy rain	0.6 to 10	calm to small wavelets	-3:45	yes
	07:15 to 12:48	pier one alt.	none to heavy rain	0.5 to 5	calm to small wavelets	-3:45	yes
3/10/2016	08:43 to 09:26	pier one alt.	none	5	calm	-2:53	no
	08:45 to 09:26	near island	none	8	calm	-2:51	no
3/11/2016	16:27 to 17:18	near island	heavy rain	2	calm	4:15	no
	10:55 to 13:11	pier one alt.	none	7 to 8	calm	-1:59	no
3/12/2016	11:05 to 13:11	near island	none	7 to 9	calm to small wavelets	-1:49	no
	13:55 to 14:39	pier one alt.	none	8 to 9	calm	1:01	yes
	13:58 to 14:39	near island	none	7	small wavelets	1:04	yes
	15:26 to 17:14	near island	none	7	calm to small wavelets	2:32	no
	15:26 to 17:15	pier one alt.	none	8 to 10	calm	2:32	no
3/14/2016	10:29 to 18:36	pier one alt.	none to light rain	7 to 10	calm	-3:55	yes
	10:31 to 18:36	near island	none to light rain	3 to 10	calm to small wavelets	-3:53	yes

Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
3/15/2016	08:11 to 17:32	pier one alt.	none to light rain	7 to 10	calm	4:53	yes
	08:15 to 17:34	near island	none to heavy rain	4 to 10	calm	4:57	yes
3/16/2016	08 to 17:59	near island	none	0.6 to 10	calm	3:30	yes
	08:03 to 17:58	pier one alt.	none	1.5 to 10	calm	3:33	yes
3/17/2016	07:33 to 17:42	pier one alt.	none to heavy snow	0.3 to 10	calm to small wavelets	1:21	yes
	08:04 to 17:41	near island	none to heavy snow	2 to 10	calm to small wavelets	1:52	yes
3/18/2016	08:05 to 19:36	near island	none to light rain	0.8 to 5	calm to small wavelets	0:23	yes
	08:05 to 19:41	pier one alt.	none to light rain	0.5 to 6	calm to small wavelets	0:23	yes
3/19/2016	07:57 to 14:10	pier one alt.	light snow to heavy snow	0.5 to 9	calm	-0:39	yes
	08 to 14:10	near island	none to light snow	0.8 to 7	calm	-0:36	yes
3/21/2016	08:05 to 17:15	pier one alt.	none to light rain	0.5 to 5	calm to small wavelets	-1:43	yes
	08:07 to 17:16	near island	light rain to heavy rain	0.5 to 7	calm to small wavelets	-1:41	yes
3/22/2016	07:53 to 13:52	near island	none to light rain	0.8 to 10	calm to small wavelets	-2:25	yes
	07:53 to 15:50	pier one alt.	none to light rain	1 to 6	calm to large wavelets	-2:25	yes
	13:56 to 15:51	near island	light rain	4 to 7	calm	3:38	yes
3/30/2016	14:27 to 16:57	near island	none to light rain	3 to 6	calm	0:03	yes
	14:28 to 16:49	pier one alt.	none to light rain	2 to 4	calm	0:04	yes
	16:51 to 17:20	fullers	none	10	calm	2:27	yes
	17:01 to 17:57	near island	none	6	calm	2:37	yes
	17:19 to 18:08	pier one alt.	none	10	calm	2:55	yes
	3/31/2016	07:27 to 08:44	pier one	none	10	calm	3:21
07:30 to 17:30		near island	none to light rain	0.6 to 10	calm	3:24	yes
08:43 to 10:21		pier one alt.	none	10	calm	4:37	yes
10:21 to 12:14		fullers	none to light rain	8 to 9	calm	-4:57	yes

Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
3/31/2016 (cont.)	12:14 to 14:56	pier one alt.	none to light rain	2 to 3	calm	-3:04	no
	15 to 17:24	pier one alt.	none to light rain	1.5 to 10	calm	-0:18	yes
4/1/2016	07:23 to 08:31	pier one alt.	light rain	3 to 5	small wavelets	2:05	yes
	07:29 to 16:15	near island	none to heavy rain	5 to 10	calm to large wavelets	2:11	yes
	09:42 to 11:54	pier one alt.	none to light rain	10	calm	4:24	yes
	14:28 to 16:18	pier one alt.	none to light rain	6 to 7	calm to small wavelets	-2:20	no
4/12/2016	09:09 to 17:22	pier one alt.	light rain to heavy rain	1.5 to 10	calm to small wavelets	-4:45	yes
4/12/2016	09:10 to 17:21	near island	none to heavy rain	1.5 to 10	calm to small wavelets	-4:44	yes
4/13/2016	07 to 13:01	pier one alt.	none	9 to 10	calm	3:54	yes
	07:02 to 17:30	near island	none	10	calm	3:56	yes
	13:01 to 13:16	fullers	none	10	calm	-2:05	no
	13:13 to 15:21	pier one alt.	none	10	calm	-1:53	yes
	15:10 to 16	fullers	none	10	calm	0:04	no
	16 to 16:32	pier one alt.	none	10	calm	0:54	no
	16:31 to 17:28	fullers	none	10	calm	1:25	yes
4/14/2016	07 to 13	pier one alt.	none to heavy rain	5 to 10	calm	2:30	yes
	07 to 17	near island	none to light rain	5 to 10	calm to small waves	2:30	yes
	13:01 to 13:21	fullers	none	8	calm	-3:05	yes
	13:20 to 16:22	pier one alt.	none	8 to 10	calm	-2:46	yes
	16:22 to 17:01	fullers	light rain	8	calm	0:16	yes
	4/15/2016	08:03 to 17:35	pier one alt.	none to heavy rain	4 to 10	calm	2:15
4/15/2016	08:06 to 18:04	near island	none to heavy rain	5 to 10	calm to small waves	2:18	yes
	17:34 to 18:04	fullers	light rain	10	calm	0:16	no
	4/16/2016	08:04 to 13:38	pier one alt.	none to light rain	10	calm	1:10
4/16/2016	08:05 to 16:57	near island	none to light rain	9 to 10	calm	1:11	yes
	14:29 to 16:21	fullers	none	10	calm	-4:31	yes
	16:20 to 16:56	pier one alt.	none	10	calm	-2:40	yes

## Appendix G. Continued.

Day	Observation times	Observation location	Precip.	Visibility (km)	Wave conditions	Time relative to high tide <sup>a</sup>	Construction
4/18/2016	07:19 to 12:08	pier one alt.	none	10	calm	-1:17	yes
	07:30 to 16	near island	none	10	calm to large waves	-1:06	yes
	12:07 to 13:41	fullers	none	10	calm	3:31	yes
	13:38 to 16:01	pier one alt.	none	10	calm	5:02	yes
5/23/2016	16:57 to 18:04	pier one alt.	none	10	calm to small wavelets	5:45	no
	16:59 to 18:04	near island	none	10	calm	5:47	no
5/24/2016	14:33 to 17:41	pier one alt.	none	10	calm to small wavelets	2:51	yes
	14:35 to 17:43	near island	none	10	calm to large wavelets	2:53	yes
5/25/2016	09:26 to 12:16	pier one alt.	none	10	calm	-2:52	yes
	09:30 to 12:16	near island	none	10	calm	-2:48	yes
6/14/2016	07:22 to 08:11	pier one alt.	none	10	calm	1:16	no
	07:29 to 08:01	near island	none	10	calm	1:23	no
	08:05 to 08:30	near island	none	10	calm	1:59	yes
	08:17 to 10:30	pier one alt.	none	10	calm	2:11	yes
	08:30 to 10:17	near island	none	10	small wavelets to large wavelets	2:24	yes
	12 to 13:33	near island	none	10	calm to small wavelets	5:54	yes
	12:05 to 12:30	pier one alt.	none	10	calm	5:59	no
	12:35 to 13:31	pier one alt.	none	10	calm	-6:07	yes
6/15/2016	09:05 to 10:31	pier one alt.	none	10	calm	2:05	yes
	09:05 to 11:50	near island	none	10	calm to small wavelets	2:05	yes
	10:35 to 15:07	pier one alt.	none	10	calm	3:35	yes
	12:50 to 15:09	near island	none	10	calm	5:50	yes
6/16/2016	15 to 17:55	near island	none	10	calm	-5:42	yes
	15:08 to 17:55	pier one alt.	none	10	calm	-5:34	yes

<sup>a</sup> negative times indicate time until high tide, positive times indicate time after high tide.

Appendix H. Twilight, sunrise, and sunset times over the duration of the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.

Date	Begin Civil Twilight	Sunrise	End Civil Twilight	Sunset
11/1/2015	07:41	08:23	18:04	17:22
11/2/2015	07:43	08:25	18:02	17:20
11/3/2015	07:45	08:28	18:00	17:18
11/4/2015	07:47	08:30	17:58	17:16
11/5/2015	07:50	08:32	17:56	17:13
11/6/2015	07:52	08:35	17:54	17:11
11/7/2015	07:54	08:37	17:52	17:09
11/8/2015	07:56	08:39	17:50	17:07
11/9/2015	07:58	08:42	17:48	17:05
11/10/2015	08:00	08:44	17:46	17:03
11/11/2015	08:02	08:46	17:45	17:00
11/12/2015	08:04	08:48	17:43	16:58
11/13/2015	08:06	08:51	17:41	16:57
11/14/2015	08:08	08:53	17:39	16:55
11/15/2015	08:10	08:55	17:38	16:53
11/16/2015	08:12	08:57	17:36	16:51
11/17/2015	08:14	09:00	17:34	16:49
11/18/2015	08:16	09:02	17:33	16:47
11/19/2015	08:18	09:04	17:31	16:46
11/20/2015	08:20	09:06	17:30	16:44
11/21/2015	08:22	09:08	17:29	16:42
11/22/2015	08:24	09:10	17:27	16:41
11/23/2015	08:25	09:12	17:26	16:39
11/24/2015	08:27	09:14	17:25	16:38
11/25/2015	08:29	09:17	17:24	16:36
11/26/2015	08:31	09:19	17:23	16:35
11/27/2015	08:33	09:20	17:21	16:34
11/28/2015	08:34	09:22	17:20	16:32
11/29/2015	08:36	09:24	17:19	16:31
11/30/2015	08:38	09:26	17:19	16:30
12/1/2015	08:39	09:28	17:18	16:29
12/2/2015	08:41	09:30	17:17	16:28
12/3/2015	08:42	09:32	17:16	16:27
12/4/2015	08:44	09:33	17:16	16:26
12/5/2015	08:45	09:35	17:15	16:25
12/6/2015	08:46	09:36	17:15	16:25
12/7/2015	08:48	09:38	17:14	16:24
12/8/2015	08:49	09:39	17:14	16:23
12/9/2015	08:50	09:41	17:13	16:23
12/10/2015	08:52	09:42	17:13	16:22
12/11/2015	08:53	09:43	17:13	16:22
12/12/2015	08:54	09:45	17:13	16:22
12/13/2015	08:55	09:46	17:13	16:22
12/14/2015	08:56	09:47	17:13	16:22
12/15/2015	08:57	09:48	17:13	16:22
12/16/2015	08:58	09:49	17:13	16:22

## Appendix H. Continued.

Date	Begin Civil Twilight	Sunrise	End Civil Twilight	Sunset
12/17/2015	08:58	09:50	17:13	16:22
12/18/2015	08:59	09:51	17:13	16:22
12/19/2015	09:00	09:51	17:14	16:22
12/20/2015	09:00	09:52	17:14	16:23
12/21/2015	09:01	09:52	17:14	16:23
12/22/2015	09:01	09:53	17:15	16:24
12/23/2015	09:02	09:53	17:16	16:24
12/24/2015	09:02	09:54	17:16	16:25
12/25/2015	09:03	09:54	17:17	16:26
12/26/2015	09:03	09:54	17:18	16:26
12/27/2015	09:03	09:54	17:19	16:27
12/28/2015	09:03	09:54	17:19	16:28
12/29/2015	09:03	09:54	17:20	16:29
12/30/2015	09:03	09:54	17:21	16:31
12/31/2015	09:03	09:54	17:23	16:32
1/1/2016	09:03	09:54	17:24	16:33
1/2/2016	09:03	09:53	17:25	16:34
1/3/2016	09:02	09:53	17:26	16:36
1/4/2016	09:02	09:52	17:27	16:37
1/5/2016	09:02	09:52	17:29	16:39
1/6/2016	09:01	09:51	17:30	16:40
1/7/2016	09:01	09:50	17:31	16:42
1/8/2016	09:00	09:49	17:33	16:44
1/9/2016	08:59	09:49	17:34	16:45
1/10/2016	08:59	09:48	17:36	16:47
1/11/2016	08:58	09:47	17:38	16:49
1/12/2016	08:57	09:45	17:39	16:51
1/13/2016	08:56	09:44	17:41	16:53
1/14/2016	08:55	09:43	17:43	16:55
1/15/2016	08:54	09:42	17:44	16:57
1/16/2016	08:53	09:41	17:46	16:59
1/17/2016	08:52	09:39	17:48	17:01
1/18/2016	08:51	09:38	17:50	17:03
1/19/2016	08:49	09:36	17:52	17:05
1/20/2016	08:48	09:35	17:54	17:07
1/21/2016	08:47	09:33	17:56	17:09
1/22/2016	08:45	09:32	17:58	17:11
1/23/2016	08:44	09:30	18:00	17:14
1/24/2016	08:43	09:28	18:02	17:16
1/25/2016	08:41	09:26	18:04	17:18
1/26/2016	08:39	09:24	18:06	17:20
1/27/2016	08:38	09:23	18:08	17:23
1/28/2016	08:36	09:21	18:10	17:25
1/29/2016	08:34	09:19	18:12	17:27
1/30/2016	08:33	09:17	18:14	17:30
1/31/2016	08:31	09:15	18:16	17:32
2/1/2016	08:29	09:13	18:18	17:34

## Appendix H. Continued.

Date	Begin Civil Twilight	Sunrise	End Civil Twilight	Sunset
2/2/2016	08:27	09:11	18:20	17:37
2/3/2016	08:25	09:08	18:22	17:39
2/4/2016	08:23	09:06	18:25	17:42
2/5/2016	08:21	09:04	18:27	17:44
2/6/2016	08:19	09:02	18:29	17:46
2/7/2016	08:17	09:00	18:31	17:49
2/8/2016	08:15	08:57	18:33	17:51
2/9/2016	08:13	08:55	18:35	17:53
2/10/2016	08:11	08:53	18:38	17:56
2/11/2016	08:09	08:50	18:40	17:58
2/12/2016	08:07	08:48	18:42	18:01
2/13/2016	08:04	08:46	18:44	18:03
2/14/2016	08:02	08:43	18:46	18:05
2/15/2016	08:00	08:41	18:49	18:08
2/16/2016	07:58	08:38	18:51	18:10
2/17/2016	07:55	08:36	18:53	18:12
2/18/2016	07:53	08:33	18:55	18:15
2/19/2016	07:50	08:31	18:58	18:17
2/20/2016	07:48	08:28	19:00	18:19
2/21/2016	07:46	08:26	19:02	18:22
2/22/2016	07:43	08:23	19:04	18:24
2/23/2016	07:41	08:20	19:06	18:27
2/24/2016	07:38	08:18	19:09	18:29
2/25/2016	07:36	08:15	19:11	18:31
2/26/2016	07:33	08:13	19:13	18:34
2/27/2016	07:31	08:10	19:15	18:36
2/28/2016	07:28	08:07	19:18	18:38
2/29/2016	07:25	08:05	19:20	18:40
3/1/2016	07:23	08:02	19:22	18:43
3/2/2016	07:20	07:59	19:24	18:45
3/3/2016	07:17	07:56	19:26	18:47
3/4/2016	07:15	07:54	19:29	18:50
3/5/2016	07:12	07:51	19:31	18:52
3/6/2016	07:09	07:48	19:33	18:54
3/7/2016	07:07	07:46	19:35	18:56
3/8/2016	07:04	07:43	19:38	18:59
3/9/2016	07:01	07:40	19:40	19:01
3/10/2016	06:59	07:37	19:42	19:03
3/11/2016	06:56	07:35	19:44	19:05
3/12/2016	06:53	07:32	19:47	19:08
3/13/2016	06:50	07:29	19:49	19:10
3/14/2016	06:47	07:26	19:51	19:12
3/15/2016	07:45	08:23	20:53	20:14
3/16/2016	07:42	08:21	20:56	20:17
3/17/2016	07:39	08:18	20:58	20:19
3/18/2016	07:36	08:15	21:00	20:21
3/19/2016	07:33	08:12	21:02	20:23
3/20/2016	07:30	08:09	21:05	20:25

## Appendix H. Continued.

Date	Begin Civil Twilight	Sunrise	End Civil Twilight	Sunset
3/21/2016	07:28	08:07	21:07	20:28
3/22/2016	07:25	08:04	21:09	20:30
3/23/2016	07:22	08:01	21:11	20:32
3/24/2016	07:19	07:58	21:14	20:34
3/25/2016	07:16	07:55	21:16	20:37
3/26/2016	07:13	07:53	21:18	20:39
3/27/2016	07:10	07:50	21:21	20:41
3/28/2016	07:07	07:47	21:23	20:43
3/29/2016	07:04	07:44	21:25	20:45
3/30/2016	07:02	07:41	21:28	20:48
3/31/2016	06:59	07:39	21:30	20:50
4/1/2016	06:56	07:36	21:32	20:52
4/2/2016	06:53	07:33	21:35	20:54
4/3/2016	06:50	07:30	21:37	20:56
4/4/2016	06:47	07:27	21:39	20:59
4/5/2016	06:44	07:25	21:42	21:01
4/6/2016	06:41	07:22	21:44	21:03
4/7/2016	06:38	07:19	21:47	21:05
4/8/2016	06:35	07:16	21:49	21:07
4/9/2016	06:32	07:14	21:51	21:10
4/10/2016	06:29	07:11	21:54	21:12
4/11/2016	06:26	07:08	21:56	21:14
4/12/2016	06:23	07:05	21:59	21:16
4/13/2016	06:20	07:03	22:01	21:18
4/14/2016	06:17	07:00	22:04	21:21
4/15/2016	06:15	06:57	22:06	21:23
4/16/2016	06:12	06:55	22:09	21:25
4/17/2016	06:09	06:52	22:11	21:27
4/18/2016	06:06	06:49	22:14	21:30
4/19/2016	06:03	06:47	22:16	21:32
4/20/2016	06:00	06:44	22:19	21:34
4/21/2016	05:57	06:42	22:21	21:36
4/22/2016	05:54	06:39	22:24	21:39
4/23/2016	05:51	06:36	22:26	21:41
4/24/2016	05:48	06:34	22:29	21:43
4/25/2016	05:45	06:31	22:31	21:45
4/26/2016	05:42	06:29	22:34	21:47
4/27/2016	05:40	06:26	22:37	21:50
4/28/2016	05:37	06:24	22:39	21:52
4/29/2016	05:34	06:21	22:42	21:54
4/30/2016	05:31	06:19	22:45	21:56
5/1/2016	05:28	06:16	22:47	21:58
5/2/2016	05:25	06:14	22:50	22:01
5/3/2016	05:22	06:11	22:52	22:03
5/4/2016	05:20	06:09	22:55	22:05
5/5/2016	05:17	06:07	22:58	22:07
5/6/2016	05:14	06:04	23:00	22:09
5/7/2016	05:11	06:02	23:03	22:11

Appendix H. Continued.

Date	Begin Civil Twilight	Sunrise	End Civil Twilight	Sunset
5/8/2016	05:08	06:00	23:06	22:14
5/9/2016	05:06	05:58	23:08	22:16
5/10/2016	05:03	05:56	23:11	22:18
5/11/2016	05:00	05:53	23:14	22:20
5/12/2016	04:58	05:51	23:16	22:22
5/13/2016	04:55	05:49	23:19	22:24
5/14/2016	04:52	05:47	23:22	22:26
5/15/2016	04:50	05:45	23:24	22:28
5/16/2016	04:47	05:43	23:27	22:30
5/17/2016	04:45	05:41	23:30	22:32
5/18/2016	04:42	05:39	23:32	22:34
5/19/2016	04:40	05:37	23:35	22:36
5/20/2016	04:37	05:35	23:37	22:38
5/21/2016	04:35	05:34	23:40	22:40
5/22/2016	04:32	05:32	23:42	22:42
5/23/2016	04:30	05:30	23:45	22:44
5/24/2016	04:28	05:29	23:47	22:46
5/25/2016	04:25	05:27	23:50	22:47
5/26/2016	04:23	05:25	23:52	22:49
5/27/2016	04:21	05:24	23:55	22:51
5/28/2016	04:19	05:23	23:57	22:52
5/29/2016	04:17	05:21	23:59	22:54
5/30/2016	04:15	05:20	24:01	22:56
5/31/2016	04:13	05:19	24:04	22:57
6/1/2016	04:11	05:17	24:06	22:59
6/2/2016	04:09	05:16	24:08	23:00
6/3/2016	04:08	05:15	24:10	23:01
6/4/2016	04:06	05:14	24:12	23:03
6/5/2016	04:04	05:13	24:13	23:04
6/6/2016	04:03	05:12	24:15	23:05
6/7/2016	04:02	05:12	24:17	23:06
6/8/2016	04:00	05:11	24:18	23:07
6/9/2016	03:59	05:10	24:20	23:08
6/10/2016	03:58	05:10	24:21	23:09
6/11/2016	03:57	05:09	24:23	23:10
6/12/2016	03:56	05:09	24:24	23:11
6/13/2016	03:55	05:08	24:25	23:12
6/14/2016	03:55	05:08	24:26	23:12
6/15/2016	03:54	05:08	24:27	23:13
6/16/2016	03:54	05:08	24:28	23:14
6/17/2016	03:54	05:08	24:28	23:14
6/18/2016	03:53	05:08	24:29	23:14
6/19/2016	03:53	05:08	24:29	23:15
6/20/2016	03:54	05:08	24:29	23:15
6/21/2016	03:54	05:08	24:29	23:15
6/22/2016	03:54	05:08	24:29	23:15
6/23/2016	03:55	05:09	24:29	23:15
6/24/2016	03:55	05:09	24:29	23:15

Appendix H. Continued.

Date	Begin Civil Twilight	Sunrise	End Civil Twilight	Sunset
6/25/2016	03:56	05:10	24:28	23:15
6/26/2016	03:57	05:10	24:28	23:15
6/27/2016	03:58	05:11	24:27	23:14
6/28/2016	03:59	05:12	24:26	23:14
6/29/2016	04:00	05:12	24:26	23:14
6/30/2016	04:01	05:13	24:25	23:13

Appendix I. Observation details for animals recorded as Level B take during the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
11/14	STSL	8:54	unk	F	travel		travel	2	252	vibratory	<5
11/14	STSL	9:03	unk	unk	mill		mill	1	85	vibratory	<5
11/14	STSL	9:24	adult	unk	swimming toward site	9:29	mill	1	72	vibratory	<5
11/14	STSL	9:24	unk	unk	swimming toward site	9:30	swimming away from site	1	123	vibratory	<5
11/14	STSL	9:30	adult	M	swimming away from site		swimming away from site	1	330	vibratory	<5
11/14	STSL	9:34	adult	M	swimming toward site		swimming toward site	1	335	vibratory	<5
11/14	STSL	11:02	adult	M	travel		travel	1	367	vibratory	<5
11/14	STSL	11:05	adult	M	travel		travel	1	326	vibratory	<5
11/14	STSL	11:31	adult	M	mill		mill	1	306	vibratory	<5
11/14	STSL	13:46	adult	M	travel		travel	1	372	vibratory	<5
11/14	STSL	14:24	adult	F	travel		travel	1	350	vibratory	<5
11/14	STSL	10:36	juvenile	unk	travel		travel	2	34	vibratory	<5
11/14	STSL	11:00	adult	M	travel		travel	1	53	vibratory	<5
11/14	STSL	11:05	adult	M	travel		travel	1	17	vibratory	49
11/14	STSL	14:15	adult	M	travel		travel	1	33	vibratory	<5
11/17	STSL	10:27	adult	M	swimming away from site		swimming away from site	1	386	vibratory	<5
11/17	STSL	9:52	adult	M	travel		travel	1	275	vibratory	<5
12/14	STSL	12:08	adult	unk	dive		dive	1	1033	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
12/15	STSL	9:46	adult	M	swimming away from site		mill;swimming away from site	1	149	vibratory	<5
12/15	STSL	9:58	adult	F	alert		alert	1	709	vibratory	<5
12/15	STSL	15:32	adult	M	travel		travel	1	272	dhd	<5
12/15	STSL	10:16	unk	F	spyhop		spyhop;travel	1	310	vibratory	77
12/15	STSL	14:54	adult	unk	alert		alert	1	109	dhd	62
12/19	STSL	10:10	unk	unk	travel		travel	1	244	vibratory	<5
12/19	STSL	11:28	unk	unk	travel		travel	1	545	vibratory	<5
12/19	STSL	11:01	unk	unk	travel		travel	1	266	vibratory	<5
1/5	STSL	12:07	adult	F	swimming away from site		swimming away from site	1	211	dhd	<5
1/5	STSL	12:43	adult	F	feeding		feeding	1	244.4	dhd	<5
1/5	STSL	15:37	juvenile	M	travel		mill;travel	1	93	dhd	7
1/5	STSL	10:49	adult	M	travel		travel	1	22	dhd	<5
1/5	STSL	14:01	adult	M	travel		travel	1	247	dhd	<5
1/6	STSL	13:49	adult	F	travel		travel	1	328	impact	<5
1/6	STSL	13:56	adult	M	mill		mill	2	81.8	impact	<5
1/9	STSL	10:15	adult	unk	travel		travel	2	36	vibratory	<5
1/13	HASE	11:56	unk	unk	travel		travel	1	429	vibratory	<5
1/13	STSL	12:09	adult	unk	mill		mill	2	74.3	vibratory	<5
1/18	STSL	15:28	adult	M	travel		travel	1	281	vibratory	<5
1/18	STSL	15:51	unk	F	travel		travel	1	115	vibratory	<5
1/19	STSL	16:44	adult		feeding	16:59	feeding	2	52	vibratory	11
1/20	STSL	14:52	adult	F	travel		travel	1	336	vibratory	<5
1/20	STSL	15:14	adult	F	travel		travel	1	275	vibratory	<5
1/20	STSL	14:48	adult	F	travel		travel	1	115	vibratory	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
1/20	STSL	15:15	adult	F	unknown		unknown	1	198	vibratory	<5
1/20	STSL	15:12	adult	M	mill		mill	1	53	vibratory	<5
1/20	STSL	9:54	adult	M	mill		mill	1	55.5	vibratory	<5
1/22	STSL	11:14	juvenile	M	travel		travel	1	282	dhd	<5
1/22	STSL	14:50	adult	M	unknown		travel;unknown	2	136	impact	<5
1/22	STSL	11:30	adult	M	travel		travel	1	215	dhd	<5
1/22	STSL	14:34	adult/subadult	F	travel		travel	3	351	vibratory	<5
1/22	STSL	15:07	juvenile	M	travel		travel	1	333	impact	<5
1/23	STSL	11:49	adult	M	mill		mill	4	57	impact	<5
1/23	STSL	12:20	adult		travel	12:28	travel	3	42	impact	<5
1/23	STSL	11:46	adult	F	travel		travel	1	315	impact	<5
1/23	STSL	12:26	adult	M	travel		travel	1	346	impact	<5
1/23	STSL	12:27	adult	M	travel		travel	1	244	impact	<5
1/23	STSL	10:40	adult		travel	11:12	mill	2	54	vibratory	<5
1/23	STSL	11:15	adult	F	vessel interaction		vessel interaction	1	660	vibratory	<5
1/23	STSL	14:20	adult		travel		travel	5	415	vibratory	<5
1/25	STSL	10:00	adult	M	mill		mill	1	65	vibratory	<5
1/25	STSL	10:11	adult		feeding		feeding	6	45	vibratory	<5
1/25	STSL	10:16	adult		feeding		feeding	2	131	vibratory	<5
1/25	STSL	11:13	unk	unk	dive		dive	1	483	vibratory	<5
1/25	STSL	11:20	adult	F	travel		travel	1	123	vibratory	<5
1/25	STSL	11:20	unk	F	feeding		feeding	2	29	vibratory	<5
1/25	STSL	15:30	juvenile	M	dive		dive	1	235	dhd	<5
1/25	STSL	15:46	adult	F	travel		travel	2	82	dhd	<5
1/25	STSL	10:04	adult	M	travel		travel	3	301	vibratory	16
1/25	STSL	10:32	adult		travel		travel	2	312	vibratory	<5
1/25	STSL	11:17	adult	M	resting		resting	1	351	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
1/25	STSL	15:09	adult		feeding		feeding	3	32	dhd	14
1/25	STSL	16:59	adult	F	dive		dive	1	99	dhd	<5
1/26	STSL	11:00	adult	M	travel		travel	1	282.1	dhd	<5
1/26	STSL	11:00	adult	F	travel		travel	1	210.3	dhd	<5
1/26	STSL	11:09	adult	F	travel		feeding;travel	1	255	dhd	<5
1/26	STSL	11:14	juvenile	unk	travel		travel	1	296.8	dhd	<5
1/26	STSL	16:01	adult	M	travel		travel	1	558	vibratory	<5
1/26	STSL	10:44	juvenile	M	travel	10:48	travel	2	230	dhd	<5
1/26	STSL	10:58	adult	M	mill		mill;resting	1	22	dhd	<5
1/26	STSL	13:19	unk	unk	dive		dive	1	352	vibratory	<5
1/26	STSL	13:27	adult	F	travel		travel	1	361	vibratory	<5
1/26	STSL	13:31	juvenile	M	travel		travel	1	312	vibratory	<5
1/26	STSL	11:09	adult	F	swimming away from site		swimming away from site	2	18	dhd	<5
1/26	STSL	11:11	adult	M	resting		resting;travel	1	139	dhd	<5
1/26	STSL	11:16	adult	M	travel		travel	1	172.3	dhd	<5
1/26	STSL	11:19	unk	M	travel		travel	1	184	dhd	5
1/26	STSL	11:24	adult	M	feeding		feeding;travel	1	146	dhd	<5
1/26	STSL	11:25	adult		travel		travel	5	221	dhd	<5
1/26	STSL	11:43	adult	F	travel		travel	1	196	dhd	<5
1/27	STSL	16:08	adult	F	travel		travel	1	345	vibratory	<5
1/27	STSL	11:00	unk	unk	dive		dive	2	123	impact	<5
1/27	STSL	16:02	adult	F	travel		travel	1	26	vibratory	<5
1/28	STSL	10:47	adult	M	travel		travel	1	194	dhd	<5
1/28	STSL	10:50	adult	M	travel		travel	1	21	dhd	5
1/28	STSL	10:58	adult	M	travel		travel	1	21	dhd	<5
1/28	STSL	16:16	juvenile	F	travel		travel	1	37	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
1/28	STSL	9:50	adult	F	travel		travel	1	136	dhd	<5
1/28	STSL	11:32	adult	M	mill		mill;travel	1	106	dhd	<5
1/28	STSL	14:45	adult	M	travel		travel	1	232	dhd	<5
1/28	STSL	15:24	juvenile	F	travel		travel	1	58	dhd	5
1/28	STSL	15:54	unk		travel		alert;travel	2	113	dhd	<5
1/28	STSL	10:27	unk	unk	dive		dive	1	138	dhd	<5
1/28	STSL	11:00	juvenile	F	spyhop		spyhop	1	233	dhd	<5
1/28	STSL	14:50	adult	M	feeding		feeding;travel	1	250	dhd	6
1/28	STSL	16:12	adult	F	travel		travel	1	246	dhd	<5
1/28	STSL	16:14	adult	M	travel		travel	1	112.1	dhd	<5
1/28	STSL	16:20	adult	M	travel		travel	1	115	dhd	<5
1/28	STSL	16:55	adult	M	travel		travel	1	275	vibratory	<5
1/28	STSL	17:13	juvenile	F	travel		travel	1	233	vibratory	<5
1/29	STSL	10:16	adult	M	travel		mill;travel	1	60	dhd	5
1/29	STSL	10:25	adult	M	travel		travel	1	296	dhd	<5
1/29	STSL	10:26	adult	F	travel		travel	1	271	dhd	<5
1/29	STSL	10:35	juvenile	M	travel		travel	3	228.2	dhd	<5
1/29	STSL	10:36	adult	M	travel		travel	1	232	dhd	<5
1/29	STSL	13:33	adult		travel		travel	7	37	dhd	5
1/29	STSL	13:35	adult	M	mill		mill;travel	1	48	dhd	8
1/29	STSL	13:49	adult	M	travel		travel	1	122.4	dhd	<5
1/29	STSL	13:54	adult	M	travel		travel	5	102	dhd	<5
1/29	STSL	14:30	juvenile	unk	travel		travel	1	48	dhd	<5
1/29	STSL	14:35	adult	M	travel		travel	2	25	dhd	10
1/29	STSL	14:37	adult	F	travel		travel	1	116	dhd	<5
1/29	STSL	14:41	juvenile	unk	travel		travel	1	65	dhd	<5
1/29	STSL	14:50	adult	M	travel		travel	1	13	dhd	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
1/29	STSL	17:04	unk	unk	travel		travel	1	310	impact	<5
1/29	STSL	17:07	adult		mill		mill	5	168	impact	<5
1/29	STSL	9:43	unk	M	travel		travel	1	76	dhd	<5
1/29	STSL	10:13	adult/subadult	M	feeding		feeding;mill	2	56	dhd	24
1/29	STSL	10:35	adult	M	feeding		feeding	2	167	dhd	<5
1/29	STSL	10:42	adult/subadult		mill	12:08	mill	5	220.2	dhd	<5
1/29	STSL	12:01	unk	unk	travel		travel	1	294	dhd	<5
1/29	STSL	12:06	adult	unk	dive		dive;travel	1	253	dhd	13
1/29	STSL	13:01	unk		travel		travel	3	280	dhd	<5
1/29	STSL	15:49	unk	unk	dive		dive	1	18	vibratory	<5
1/29	STSL	15:59	adult	M	mill		mill	2	41	vibratory	<5
1/29	STSL	16:02	adult	M	travel		travel	1	29	vibratory	<5
1/29	STSL	16:11	adult	F	travel		travel	1	117	vibratory	<5
1/29	STSL	16:19	unk	unk	travel		travel	3	29	vibratory	<5
1/29	STSL	16:29	unk	unk	dive		dive	1	39	vibratory	<5
1/29	STSL	17:08	adult/subadult		travel		travel	6	268	impact	<5
1/29	STSL	8:59	adult/subadult		vessel interaction	9:36	mill;vessel interaction	8	49	dhd	10
1/29	STSL	11:15	adult	F	vessel interaction	12:24	mill;resting;travel	2	77	dhd	79
1/29	STSL	12:39	adult		vessel interaction		vessel interaction	5	233	dhd	<5
1/29	STSL	15:51	adult	M	travel		travel	1	294	vibratory	<5
1/29	STSL	17:11	adult/subadult		travel		travel	8	126	impact	<5
1/29	STSL	16:11	adult	M	travel		travel	2	492.6	vibratory	<5
1/30	STSL	9:25	juvenile	M	travel	9:30	travel	1	160	vibratory	<5
1/30	STSL	14:26	adult	M	travel		travel	1	143	dhd	4
1/30	STSL	14:51	adult	F	travel		travel	1	270	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
1/30	STSL	15:10	juvenile	F	travel		travel	1	283	dhd	<5
1/30	STSL	11:37	adult	M	travel		travel	1	358	vibratory	<5
1/30	STSL	14:32	adult	F	travel		travel	1	158	dhd	<5
1/30	STSL	14:40	juvenile	M	travel		travel	1	69	dhd	<5
1/30	STSL	14:45	adult/subadult		mill		mill	3	52	dhd	<5
1/30	STSL	15:00	adult/subadult		mill		mill	5	50	dhd	<5
1/30	STSL	16:28	adult/subadult		travel		travel	4	312	impact	<5
1/30	STSL	8:37	adult	M	mill	9:34	mill	1	59	vibratory	<5
1/30	STSL	13:22	adult		travel	15:21	travel	6	126	dhd	<5
2/1	STSL	10:47	adult	M	travel	11:43	mill	1	30	vibratory	<5
2/1	STSL	11:15	unk	M	travel		travel	1	21	vibratory	<5
2/1	STSL	11:16	adult	M	travel		travel	1	521	vibratory	<5
2/1	STSL	11:17	unk	unk	dive		dive	1	415	vibratory	<5
2/1	STSL	11:31	juvenile	unk	mill		mill	1	248	vibratory	<5
2/1	STSL	11:39	adult	M	travel		travel	2	31	vibratory	<5
2/11	STSL	16:03	adult	F	mill		mill	1	39	vibratory	38
2/11	STSL	16:29	adult	M	mill		mill	3	53.4	vibratory	<5
2/11	STSL	16:00	adult	M	travel		travel	1	257	vibratory	<5
2/11	STSL	16:01	adult	unk	mill		mill	2	245	vibratory	<5
2/11	STSL	16:21	juvenile	unk	dive		dive	1	272	vibratory	<5
2/11	STSL	16:29	adult/subadult		travel		travel	2	218	vibratory	<5
2/11	STSL	16:30	adult/subadult		travel		travel	6	391.8	vibratory	<5
2/12	HASE	11:12	unk	unk	mill	11:15	mill	1	110	vibratory	<5
2/12	STSL	11:16	adult	M	travel		travel	1	1031	vibratory	<5
2/12	STSL	11:22	juvenile	unk	travel		travel	2	404	vibratory	<5
2/12	STSL	11:31	juvenile	M	travel		travel	1	315	vibratory	<5
2/12	STSL	13:33	adult	M	unknown		unknown	1	266	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/12	STSL	11:17	unk	unk	travel		travel	1	187	vibratory	<5
2/12	STSL	11:35	adult	unk	mill		mill	1	64	vibratory	7
2/12	STSL	11:50	unk	M	unknown		unknown	1	157	vibratory	<5
2/18	STSL	13:03	adult		travel		travel	5	114	vibratory	<5
2/18	STSL	13:19	juvenile	unk	travel		mill;travel	1	202	vibratory	<5
2/18	STSL	13:37	adult		travel		travel	2	231	vibratory	<5
2/18	STSL	13:53	unk	unk	travel		travel	1	208	vibratory	<5
2/18	STSL	13:56	adult	M	travel		travel	1	267	vibratory	<5
2/18	STSL	13:16	adult	M	travel		travel	1	321	vibratory	<5
2/18	STSL	13:22	juvenile	unk	travel		travel	1	148	vibratory	<5
2/18	STSL	13:28	adult/subadult		mill		mill	3	75.7	vibratory	<5
2/18	STSL	13:38	juvenile	F	travel		travel	1	252	vibratory	<5
2/18	STSL	13:45	adult/subadult		travel		travel	5	393	vibratory	<5
2/18	STSL	13:53	juvenile	unk	travel		travel	1	288	vibratory	<5
2/18	STSL	14:01	juvenile	F	travel		travel	1	327	vibratory	<5
2/18	STSL	14:02	adult		mill		mill	3	175	vibratory	<5
2/18	STSL	14:06	juvenile	unk	travel		travel	1	202	vibratory	<5
2/19	STSL	9:15	adult	M	travel		travel	1	275	vibratory	44
2/19	STSL	9:22	adult/subadult	unk	travel		travel	3	388	vibratory	<5
2/19	STSL	9:35	juvenile	unk	travel		travel	4	250	vibratory	<5
2/19	STSL	10:02	adult/subadult	unk	travel		travel	2	373	vibratory	<5
2/19	STSL	10:11	juvenile	M	travel		travel	2	326	vibratory	<5
2/19	STSL	10:26	adult	M	mill		mill;travel	2	189	vibratory	28
2/19	STSL	10:40	adult/subadult		travel		travel	6	172	vibratory	8
2/19	STSL	13:08	adult	M	mill		mill	1	85	vibratory	<5
2/19	STSL	13:29	adult	M	fleeing		fleeing	1	66.4	vibratory	<5
2/19	STSL	14:07	adult	F	travel		travel	1	198	vibratory	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/19	STSL	8:50	adult/calves		travel		travel	5	359	vibratory	<5
2/19	STSL	10:17	adult	M	travel		travel	1	177	vibratory	<5
2/19	STSL	10:23	adult	M	mill		mill	1	129	vibratory	<5
2/19	STSL	10:55	adult		travel		travel	2	215	vibratory	<5
2/19	STSL	11:30	juvenile	M	swimming toward site		swimming toward site;travel	1	141	vibratory	7
2/19	STSL	12:06	unk	unk	travel		travel	1	78	vibratory	<5
2/19	STSL	12:13	adult	M	travel		travel	1	116	vibratory	<5
2/19	STSL	13:23	adult	M	travel		travel	2	376.4	vibratory	<5
2/19	STSL	14:06	adult	M	travel		travel	1	331	vibratory	<5
2/19	STSL	14:25	adult	F	travel		travel	1	110	vibratory	<5
2/19	STSL	8:48	adult/subadult	unk	travel		travel	3	278	vibratory	8
2/19	STSL	8:55	adult	M	mill		mill	1	105	vibratory	8
2/19	STSL	9:10	adult/subadult	unk	travel		travel	2	236	vibratory	6
2/19	STSL	9:24	adult	M	travel		travel	1	59	vibratory	<5
2/19	STSL	9:32	adult/subadult	unk	travel		travel	7	255	vibratory	7
2/19	STSL	9:42	juvenile	M	travel		travel	4	278	vibratory	<5
2/19	STSL	9:47	juvenile	M	dive		dive	1	145	vibratory	<5
2/19	STSL	9:48	juvenile	M	travel		travel	1	142.9	vibratory	<5
2/19	STSL	11:17	adult	M	travel		travel	1	389	vibratory	<5
2/19	STSL	11:27	adult	M	spyhop		spyhop	2	328	vibratory	<5
2/19	STSL	11:31	adult	M	travel		travel	1	254	vibratory	<5
2/19	STSL	11:49	adult/subadult	unk	swimming away from site		swimming away from site	2	66	vibratory	<5
2/19	STSL	12:14	adult	M	travel		travel	1	409	vibratory	<5
2/19	STSL	12:42	adult/subadult	unk	travel	12:48	travel	1	271	vibratory	<5

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Kodiak Protected Species Monitoring

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/19	STSL	12:50	adult/subadult	unk	travel		travel	2	342	vibratory	<5
2/19	STSL	13:08	juvenile	F	resting		resting	1	311	vibratory	<5
2/21	STSL	10:36	adult	M	swimming toward site		swimming toward site	1	124	dhd	<5
2/21	STSL	10:42	adult	F	travel		travel	1	299	dhd	<5
2/21	STSL	11:47	adult	F	travel	12:24	travel	1	261	dhd	<5
2/21	STSL	12:29	adult	M	travel		travel	1	190	dhd	<5
2/23	STSL	12:06	adult	M	travel		travel	1	366	vibratory	<5
2/23	STSL	11:09	adult	F	mill	11:39	play	3	312	vibratory	<5
2/23	STSL	11:38	adult		travel		travel	2	319	vibratory	<5
2/23	STSL	11:44	juvenile	F	travel		travel	1	321	vibratory	<5
2/23	STSL	11:07	adult	M	mill	11:39	mill	2	183	vibratory	<5
2/23	STSL	11:32	adult	M	travel	11:40	travel	1	235	vibratory	<5
2/23	STSL	11:44	adult	M	spyhop		spyhop	1	119	vibratory	<5
2/23	STSL	12:00	juvenile	M	mill		mill	4	131	vibratory	<5
2/24	STSL	11:20	juvenile	unk	travel		travel	1	402	vibratory	<5
2/24	STSL	11:22	juvenile	M	travel		travel	1	318	vibratory	<5
2/24	STSL	11:28	adult	M	travel		travel	1	393	vibratory	<5
2/24	STSL	12:41	adult	M	travel	13:15	travel	1	122	dhd	<5
2/24	STSL	12:58	adult	M	travel	13:03	travel	1	274	dhd	<5
2/24	STSL	16:10	adult	F	travel		travel	1	296	dhd	<5
2/24	STSL	11:21	juvenile	F	travel		travel	1	197	vibratory	<5
2/24	STSL	13:57	adult	M	mill		mill;travel	1	165	dhd	18
2/24	STSL	14:35	unk	unk	travel		travel	1	289	dhd	<5
2/24	STSL	15:02	adult	M	travel		travel	1	150	dhd	6
2/24	STSL	16:53	juvenile	M	travel		travel	1	260	dhd	<5
2/24	STSL	17:35	juvenile	unk	travel		travel	1	292	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/24	STSL	13:06	juvenile	F	alert		alert;spyhop	1	275	dhd	27
2/24	STSL	13:18	adult	M	travel		travel;vessel interaction	1	65	dhd	5
2/24	STSL	15:00	juvenile		travel		travel	3	261	dhd	<5
2/24	STSL	16:38	adult	M	travel		travel	1	241.9	dhd	<5
2/25	STSL	10:11	adult	F	travel		travel	1	313	vibratory	<5
2/25	STSL	13:16	adult	M	travel		travel	1	146	impact	<5
2/25	STSL	16:47	juvenile	unk	travel		travel	2	268	vibratory	<5
2/25	STSL	16:50	juvenile	unk	travel		travel	2	325	vibratory	<5
2/25	STSL	16:59	adult	F	travel		travel	1	290.4	vibratory	<5
2/25	STSL	17:00	adult	F	travel		travel	1	268	vibratory	<5
2/25	STSL	17:03	juvenile	unk	travel		travel	1	351	vibratory	<5
2/25	STSL	17:21	juvenile	unk	travel		travel	10	269	vibratory	6
2/25	STSL	17:23	juvenile	unk	travel		travel	3	263	vibratory	<5
2/25	STSL	8:42	adult	M	travel	9:29	resting	1	286	vibratory	<5
2/25	STSL	9:14	juvenile	M	mill		mill	1	366	vibratory	<5
2/25	STSL	9:16	adult	M	travel		travel	1	328	vibratory	<5
2/25	STSL	12:00	adult	M	feeding		feeding	1	156	vibratory	<5
2/25	STSL	12:00	unk	unk	travel		travel	1	222	vibratory	<5
2/25	STSL	17:07	adult		vessel interaction		vessel interaction	2	196	vibratory	<5
2/25	STSL	8:42	adult/subadult	M	travel	9:28	mill	2	277	vibratory	<5
2/25	STSL	9:10	adult	M	dive		dive	1	203	vibratory	<5
2/25	STSL	9:30	juvenile	M	travel		travel	1	189	vibratory	<5
2/25	STSL	9:34	juvenile	unk	travel		travel	2	189	vibratory	5
2/25	STSL	9:58	adult	M	mill		mill	1	130	vibratory	<5
2/25	STSL	10:05	adult/subadult		swimming away from site		swimming away from site	4	51	vibratory	<5

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Kodiak Protected Species Monitoring

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/25	STSL	10:27	adult	M	travel		travel	1	142	vibratory	<5
2/25	STSL	13:13	adult	M	swimming away from site		swimming away from site	1	233	impact	<5
2/25	STSL	13:18	adult	F	swimming away from site		swimming away from site	2	312	impact	<5
2/25	STSL	13:28	adult	M	spyhop		spyhop	1	221	impact	<5
2/25	STSL	16:03	adult/subadult		vessel interaction	16:43	vessel interaction	10	173	vibratory	<5
2/26	STSL	9:37	adult		vessel interaction		vessel interaction	3	60	vibratory	<5
2/26	STSL	9:53	adult/subadult		feeding		feeding	2	306	vibratory	15
2/26	STSL	14:05	adult	F	travel		travel	1	236	dhd	<5
2/26	STSL	14:10	adult	M	mill		mill	1	124	dhd	<5
2/26	STSL	14:41	adult	M	vessel interaction		vessel interaction	2	101	dhd	<5
2/26	STSL	16:02	adult	M	mill		mill	1	132	dhd	<5
2/26	STSL	16:14	adult		play		play;travel	2	289	dhd	8
2/26	STSL	16:25	juvenile	unk	travel		travel	1	291	dhd	<5
2/26	STSL	17:14	adult	F	travel		travel	1	297	dhd	<5
2/26	STSL	17:30	adult	M	vessel interaction		vessel interaction	2	284	dhd	<5
2/26	STSL	17:38	juvenile	unk	travel		porpoising;travel	11	222	dhd	<5
2/26	STSL	17:58	adult/subadult	unk	travel		porpoising;travel	7	296	dhd	<5
2/26	STSL	17:59	adult/calves	unk	travel		porpoising;travel	6	294	dhd	<5
2/26	STSL	14:20	adult	M	feeding		feeding	1	235	dhd	<5
2/26	STSL	9:13	adult/calves	F	travel		travel	2	418	vibratory	<5
2/26	STSL	9:19	adult	M	travel		travel	1	298	vibratory	<5
2/26	STSL	11:56	adult	unk	travel		travel	1	161	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/26	STSL	11:58	adult	F	travel		travel	1	222	dhd	<5
2/26	STSL	14:38	adult		travel		travel	2	250	dhd	<5
2/26	STSL	15:44	adult/subadult		travel		travel	4	257	dhd	5
2/26	STSL	17:07	adult	M	travel	17:18	travel	1	96	dhd	<5
2/26	STSL	18:05	adult/subadult	F	travel		travel	5	122	dhd	5
2/26	STSL	18:16	adult	M	travel		travel	1	296	dhd	<5
2/26	STSL	9:22	adult/subadult		travel		travel	6	237	vibratory	<5
2/26	STSL	9:55	juvenile	M	travel		travel	1	237.4	vibratory	<5
2/26	STSL	10:08	adult	M	travel		travel	1	200	vibratory	<5
2/26	STSL	12:47	adult	M	travel		travel	1	243	dhd	<5
2/26	STSL	12:52	adult	M	travel		travel	1	279	dhd	<5
2/26	STSL	13:01	adult	M	travel		travel	1	227	dhd	40
2/26	STSL	13:36	adult	M	travel		travel	1	209	dhd	5
2/26	STSL	15:39	adult	M	swimming away from site		swimming away from site	1	226	dhd	<5
2/26	STSL	16:11	juvenile	F	travel		travel	1	175	dhd	<5
2/26	STSL	16:13	juvenile	F	swimming away from site		swimming away from site	1	144	dhd	<5
2/26	STSL	16:19	juvenile		travel		travel	3	117	dhd	<5
2/26	STSL	16:21	juvenile	M	travel		travel	2	158	dhd	<5
2/26	STSL	16:34	juvenile	M	travel		travel	1	212.8	dhd	<5
2/26	STSL	18:11	juvenile	F	travel		travel	1	240	dhd	<5
2/27	STSL	10:15	adult		vessel interaction		vessel interaction	3	171	vibratory	<5
2/27	STSL	11:09	adult		vessel interaction		vessel interaction	2	235	vibratory	<5
2/27	STSL	11:05	juvenile	unk	mill		mill	1	106	vibratory	<5

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Kodiak Protected Species Monitoring

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
2/27	STSL	16:29	juvenile	unk	travel		travel	5	294	vibratory	<5
2/27	STSL	10:53	unk	unk	mill		mill	1	126	vibratory	<5
2/27	STSL	10:59	juvenile	M	mill		mill	1	351	vibratory	<5
2/27	STSL	15:35	adult	M	travel		travel	1	141	vibratory	<5
2/27	STSL	15:36	unk	unk	travel		travel	1	303	vibratory	<5
2/27	STSL	15:53	adult	F	unknown		unknown	1	166	vibratory	<5
2/27	STSL	9:56	adult	M	travel		travel	1	98	vibratory	<5
2/27	STSL	13:04	adult	M	travel		travel	1	308	impact	<5
2/27	STSL	13:30	adult	M	swimming away from site		swimming away from site	1	296	impact	<5
2/27	STSL	15:29	adult/calves		travel		travel	3	130	vibratory	<5
2/28	STSL	10:22	adult	M	travel	10:30	travel	2	118	vibratory	<5
2/28	STSL	10:37	juvenile	M	feeding		feeding	1	355	vibratory	<5
2/28	STSL	15:01	adult	M	travel		travel	1	129	vibratory	<5
2/28	STSL	10:55	adult	M	travel		travel	1	247	vibratory	<5
2/28	STSL	10:57	adult	M	travel		travel	1	225	vibratory	<5
2/28	STSL	14:46	adult	M	mill		mill	1	277	vibratory	<5
2/28	STSL	15:23	adult	M	travel		travel	2	425	vibratory	<5
2/29	STSL	9:48	adult	M	vessel interaction		travel;vessel interaction	2	298	dhd	14
2/29	STSL	12:53	adult	F	travel		travel	1	225	dhd	<5
2/29	STSL	9:06	adult	unk	travel		travel	1	229	dhd	<5
2/29	STSL	9:21	adult/subadult	unk	travel		travel	3	113	dhd	<5
2/29	STSL	9:41	juvenile	F	feeding		feeding	1	150	dhd	<5
2/29	STSL	12:49	adult	M	dive		dive	1	280	dhd	<5
2/29	STSL	13:08	adult	M	travel		travel	1	272	dhd	<5
2/29	STSL	15:51	adult	F	travel		travel	1	115	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/1	STSL	9:20	adult/calves	unk	travel		travel	3	311	vibratory	<5
3/1	STSL	9:56	juvenile	M	travel		travel	1	406	vibratory	<5
3/1	STSL	10:28	adult	F	travel		travel	1	335	impact	<5
3/1	STSL	14:27	adult	M	travel		travel	1	232	vibratory	<5
3/1	STSL	9:16	adult/calves	F	travel		travel	2	256	vibratory	<5
3/1	STSL	14:35	adult	M	vessel interaction		vessel interaction	1	701.2	vibratory	<5
3/1	STSL	14:36	adult	M	travel		travel	1	265	vibratory	14
3/1	STSL	15:29	adult	M	travel		travel	1	337	vibratory	<5
3/1	STSL	15:38	adult	M	travel		travel	1	127	vibratory	<5
3/1	STSL	15:49	adult	unk	travel		travel	1	214.6	vibratory	<5
3/1	STSL	8:24	adult/subadult	unk	resting	9:57	resting	5	152	vibratory	<5
3/1	STSL	8:58	juvenile	unk	alert		alert;travel	4	159	vibratory	<5
3/1	STSL	9:17	juvenile	unk	travel		travel	1	105	vibratory	<5
3/1	STSL	9:36	juvenile	M	travel		travel	1	201.1	vibratory	<5
3/1	STSL	9:48	adult	M	travel		travel	1	132	vibratory	<5
3/2	STSL	9:30	adult	F	travel		travel	1	286	dhd	<5
3/2	STSL	9:31	adult	M	travel		travel	1	274.6	dhd	<5
3/2	STSL	10:21	adult	M	mill		mill	1	136	dhd	<5
3/2	STSL	10:35	adult	M	travel		travel	1	234	dhd	<5
3/2	STSL	10:53	adult	F	travel		travel	1	202	dhd	<5
3/2	STSL	11:02	adult	unk	play		play	2	280	dhd	<5
3/2	STSL	11:10	adult	F	travel		travel	1	261	dhd	<5
3/2	STSL	11:10	adult	M	vessel interaction		vessel interaction	1	253	dhd	<5
3/2	STSL	11:35	adult	M	travel		travel	1	273	dhd	<5
3/2	STSL	12:09	adult	unk	vessel interaction		vessel interaction	3	239.4	dhd	<5

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## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/2	STSL	12:35	adult	M	travel		travel	2	223.8	dhd	25
3/2	STSL	10:17	adult	M	dive		dive;travel	1	61	dhd	33
3/2	STSL	10:21	adult	M	dive		dive	1	117	dhd	52
3/2	STSL	11:14	adult	F	travel		travel	1	55.9	dhd	<5
3/2	STSL	11:39	adult	M	travel		travel	1	180	dhd	<5
3/2	STSL	11:54	adult	F	travel		feeding;travel	4	104	dhd	19
3/2	STSL	13:13	juvenile	F	travel		travel	1	235	dhd	<5
3/2	STSL	13:29	juvenile	unk	travel		travel	4	212	dhd	<5
3/2	STSL	15:25	adult	M	travel		travel	1	241	dhd	<5
3/3	STSL	16:53	adult	M	vessel interaction	17:01	mill	3	124	vibratory	<5
3/4	STSL	9:46	unk	unk	travel		travel	1	271	dhd	<5
3/4	STSL	10:05	adult	M	travel		mill;travel	2	85	dhd	7
3/4	STSL	10:08	adult	F	travel		travel	1	284	dhd	<5
3/4	STSL	10:40	adult	M	travel		travel	1	218	dhd	<5
3/4	STSL	13:49	adult	M	mill		mill	1	225	dhd	<5
3/4	STSL	17:19	adult	unk	mill		mill	4	137	vibratory	<5
3/4	STSL	17:29	adult	M	mill		mill;on_land	1	110	vibratory	20
3/4	STSL	10:14	unk	M	travel		travel	1	295	dhd	<5
3/4	STSL	13:11	adult	M	travel		mill;travel	1	81	dhd	8
3/4	STSL	13:28	adult/subadult	unk	resting		mill;resting	5	73	dhd	14
3/4	STSL	14:51	adult	F	travel		travel	1	208	vibratory	<5
3/4	STSL	17:50	adult/subadult	unk	unknown		mill;unknown	6	77	vibratory	9
3/4	STSL	17:57	adult	M	mill		mill	2	180	vibratory	<5
3/4	STSL	18:08	juvenile	unk	travel		travel	3	89	vibratory	<5
3/4	STSL	17:58	juvenile	unk	travel		travel	8	207	vibratory	<5
3/4	STSL	8:08	adult/subadult	M	vessel interaction	9:33	mill;resting;vessel interaction	5	47	dhd	83

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/4	STSL	9:09	adult	M	vessel interaction	9:34	travel;vessel interaction	2	59	dhd	24
3/4	STSL	11:18	adult/subadult	unk	resting	11:30	alert;resting	6	151	dhd	69
3/4	STSL	11:31	adult	M	vessel interaction		vessel interaction	1	69.7	dhd	<5
3/4	STSL	11:56	adult	unk	travel		travel;vessel interaction	2	234	dhd	46
3/4	STSL	14:34	adult	M	resting		resting	1	145	vibratory	<5
3/4	STSL	14:35	adult	M	vessel interaction		vessel interaction	2	56	vibratory	<5
3/4	STSL	14:51	adult	F	travel		travel	1	108	vibratory	<5
3/4	STSL	14:52	adult	M	on_land		on_land	1	49	vibratory	<5
3/5	STSL	11:01	adult	M	vessel interaction		vessel interaction	5	257	dhd	<5
3/5	STSL	11:24	adult	M	dive		dive	1	218.7	dhd	<5
3/5	STSL	16:00	adult	F	travel		travel	1	216	dhd	7
3/5	STSL	8:44	unk	unk	unknown		unknown	1	52.8	vibratory	<5
3/5	STSL	8:56	adult	M	travel		travel	1	132	vibratory	<5
3/5	STSL	10:57	adult	unk	fight		fight	2	287	dhd	<5
3/5	STSL	14:45	adult	M	unknown		travel;unknown	1	113	dhd	17
3/5	STSL	9:07	adult	M	travel		travel	1	150	vibratory	<5
3/5	STSL	9:14	adult	F	travel		travel	2	335	vibratory	<5
3/5	STSL	9:20	juvenile	unk	on_land		on_land	2	325	vibratory	<5
3/5	STSL	9:30	adult	M	travel		travel	1	93	vibratory	<5
3/5	STSL	13:13	adult	M	travel		travel	1	147	dhd	<5
3/5	STSL	15:12	adult	M	travel		travel	1	280	dhd	<5
3/5	STSL	15:54	juvenile	M	travel		travel	1	289	dhd	<5
3/6	HAPO	11:29	unk	unk	travel		travel	1	327	impact	<5
3/6	STSL	9:18	unk	unk	feeding		feeding	1	238	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/6	STSL	15:39	adult	F	travel		travel	1	134.9	vibratory	<5
3/6	STSL	15:45	juvenile	unk	travel		travel	1	106	vibratory	<5
3/6	STSL	15:52	juvenile	unk	unknown		unknown	3	197	vibratory	<5
3/6	STSL	17:00	juvenile	unk	travel		travel	3	270	vibratory	9
3/6	STSL	17:02	juvenile	unk	dive		dive	3	310	vibratory	<5
3/6	STSL	8:55	juvenile	M	travel		travel	1	248	vibratory	<5
3/6	STSL	9:35	adult	unk	travel		travel	1	356	vibratory	<5
3/6	STSL	9:32	adult/subadult	M	travel		travel	3	264.7	vibratory	7
3/6	STSL	15:38	adult	unk	travel	15:59	travel	1	414	vibratory	<5
3/6	STSL	15:44	adult	F	travel		travel	1	114	vibratory	<5
3/6	STSL	8:15	adult/subadult	M	travel		travel	2	305	vibratory	<5
3/6	STSL	8:17	adult/subadult	unk	travel		travel	3	330	vibratory	<5
3/6	STSL	8:21	adult/subadult	F	travel		travel	4	344	vibratory	<5
3/6	STSL	9:41	unk	unk	mill		mill	4	64	vibratory	<5
3/6	STSL	9:42	adult	M	travel		travel	1	144	vibratory	<5
3/6	STSL	11:28	adult	F	vessel interaction		vessel interaction	1	130	impact	<5
3/6	STSL	16:06	adult	M	travel		travel	1	208	vibratory	<5
3/6	STSL	17:16	adult	unk	travel		travel	2	81	vibratory	<5
3/7	HAPO	9:08	unk	unk	travel		travel	1	295	dhd	<5
3/7	HAPO	14:38	unk	unk	travel		travel	1	343	vibratory	<5
3/7	STSL	9:09	adult	unk	feeding		feeding	2	297	dhd	<5
3/7	STSL	9:50	juvenile	unk	travel		travel	1	297	dhd	<5
3/7	STSL	10:24	adult	M	travel		travel	2	234	dhd	<5
3/7	STSL	11:33	adult	M	travel		travel	1	152	dhd	<5
3/7	STSL	12:30	adult	unk	travel		travel	3	297	dhd	<5
3/7	STSL	10:05	adult	unk	mill		mill	3	40	dhd	12
3/7	STSL	11:12	adult	M	mill		mill	1	36	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/7	STSL	11:05	adult	M	mill		mill	1	148	dhd	<5
3/7	STSL	12:32	adult	F	travel		travel	1	299.1	dhd	<5
3/7	STSL	12:36	adult	unk	feeding		feeding	1	291	dhd	<5
3/7	STSL	12:41	adult	M	unknown		unknown	1	289.4	dhd	<5
3/7	STSL	12:48	unk	M	mill		mill	1	101	dhd	<5
3/7	STSL	13:33	adult	unk	unknown		unknown	1	308	vibratory	<5
3/7	STSL	13:49	adult	M	unknown		unknown	1	363	vibratory	<5
3/7	STSL	14:28	adult	M	unknown		unknown	1	345	vibratory	<5
3/7	STSL	14:28	unk	M	unknown		unknown	1	155	vibratory	<5
3/7	STSL	15:36	adult	M	mill	15:59	mill;resting	3	123.3	vibratory	45
3/7	STSL	9:07	juvenile	unk	travel		travel	1	290	dhd	<5
3/7	STSL	9:17	adult	M	travel		travel	1	282	dhd	<5
3/7	STSL	11:37	juvenile	M	travel		travel	1	165	dhd	<5
3/7	STSL	13:36	adult	M	travel		travel	1	97	vibratory	<5
3/7	STSL	13:45	adult	M	travel		travel	2	202	vibratory	8
3/7	STSL	14:14	adult	M	fleeing		fleeing;travel	2	124	vibratory	7
3/7	STSL	16:44	adult	M	travel		travel	1	446	vibratory	<5
3/7	STSL	13:25	adult	M	travel		travel	1	97.1	vibratory	<5
3/8	STSL	16:27	adult/subadult	unk	travel		travel	5	412.7	vibratory	<5
3/8	STSL	16:07	juvenile	M	travel		travel	1	308	vibratory	<5
3/8	STSL	9:09	adult	M	feeding		feeding	1	502	vibratory	<5
3/9	STSL	8:29	juvenile	unk	travel	8:33	play	1	272	dhd	<5
3/9	STSL	11:28	adult		travel		travel	3	284.7	dhd	<5
3/9	STSL	12:25	juvenile	unk	travel		travel	2	306	impact	<5
3/9	STSL	8:53	adult	M	vessel interaction		vessel interaction	4	80	dhd	5
3/9	STSL	9:10	adult	M	vessel interaction		vessel interaction	2	83	dhd	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/9	STSL	7:57	adult	F	spyhop		spyhop	2	273.2	vibratory	<5
3/9	STSL	9:43	juvenile	F	mill		mill	1	242	dhd	<5
3/14	STSL	17:32	adult	F	travel		travel	1	297	vibratory	<5
3/14	STSL	17:37	adult	M	travel		travel	1	352	vibratory	<5
3/14	STSL	17:38	adult	unk	travel		travel	2	256	vibratory	13
3/14	STSL	17:48	adult	M	travel		travel	1	343	vibratory	<5
3/14	STSL	18:04	juvenile	unk	travel		travel	2	296	vibratory	<5
3/14	STSL	13:35	adult	M	travel		travel	1	193	vibratory	<5
3/14	STSL	17:00	adult	M	mill		mill	1	428	vibratory	<5
3/14	STSL	13:31	juvenile	F	travel		travel	1	337	vibratory	<5
3/14	STSL	18:01	adult		travel		travel	2	334	vibratory	<5
3/15	STSL	12:06	adult	M	travel		travel	1	122	dhd	<5
3/15	STSL	12:10	adult	M	mill		dive;mill	2	122	dhd	6
3/15	STSL	10:07	adult	M	travel		travel	1	135	dhd	<5
3/15	STSL	10:10	unk	unk	travel		travel	2	176	dhd	<5
3/15	STSL	11:41	juvenile	M	travel		travel	1	194	dhd	<5
3/15	STSL	12:18	adult	F	travel		travel	1	137	dhd	<5
3/15	STSL	13:29	adult	M	travel		travel	1	284	dhd	<5
3/15	STSL	15:05	adult	M	mill		mill	2	239	dhd	<5
3/15	STSL	15:38	adult	unk	travel		travel	1	219	dhd	8
3/15	STSL	10:09	adult	M	mill		mill	2	104	dhd	<5
3/15	STSL	11:18	adult/subadult	F	travel		travel	2	216	dhd	<5
3/15	STSL	13:30	adult	M	travel		travel	1	122	dhd	8
3/15	STSL	13:29	adult	M	travel		travel	1	293	dhd	7
3/15	STSL	13:55	adult	F	travel		travel	1	192	dhd	<5
3/15	STSL	16:32	adult	M	travel		travel	1	338	vibratory	<5
3/15	STSL	16:58	adult/subadult	unk	travel		travel	3	321	impact	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/16	STSL	11:11	adult	M	travel		travel	1	349	vibratory	<5
3/16	STSL	10:17	unk	unk	travel	10:22	travel	1	472	vibratory	<5
3/16	STSL	10:24	adult	M	mill		mill	1	300	vibratory	<5
3/16	STSL	10:27	adult	M	resting		resting	1	227	vibratory	32
3/16	STSL	12:19	adult/subadult	unk	travel		travel	2	136	dhd	<5
3/16	STSL	12:35	adult	M	travel		travel	1	185	dhd	<5
3/16	STSL	12:37	adult	M	travel		travel	1	198	dhd	<5
3/16	STSL	12:41	adult	F	travel		travel;unknown	1	229	dhd	<5
3/16	STSL	12:44	juvenile	F	travel		travel	1	260	dhd	<5
3/16	STSL	12:51	adult	M	mill		mill	1	71	dhd	<5
3/16	STSL	12:52	adult	M	travel		travel	1	166	dhd	<5
3/16	STSL	15:35	juvenile	unk	travel	16:01	travel	1	180	dhd	<5
3/16	STSL	16:28	unk	unk	vessel interaction		vessel interaction	1	238	dhd	<5
3/16	STSL	16:28	adult	M	travel		travel	1	195	dhd	<5
3/16	STSL	17:04	juvenile	M	travel		travel	1	287	dhd	<5
3/16	STSL	10:29	unk	unk	travel		travel	1	116	vibratory	<5
3/16	STSL	11:11	adult	unk	travel		travel	1	208	vibratory	<5
3/16	STSL	13:11	adult	unk	mill	13:55	vessel interaction	1	83	dhd	<5
3/16	STSL	13:48	adult	M	vessel interaction	13	mill;vessel interaction	2	79	dhd	5
3/16	STSL	14:46	adult	F	travel		travel	1	171	dhd	<5
3/16	STSL	16:18	adult	M	travel		travel	1	281	dhd	<5
3/16	STSL	16:36	adult	F	travel		travel	1	171	dhd	8
3/16	STSL	16:39	adult	M	travel		other;travel	1	125.7	dhd	40
3/16	STSL	11:14	juvenile	unk	travel		travel	2	379.7	vibratory	<5
3/17	KIWH	10:51	adult	unk	mill	15:27	mill	5	537	vibratory	<5
3/17	STSL	15:24	juvenile	F	travel		travel	1	347	vibratory	<5

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Kodiak Protected Species Monitoring

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/17	STSL	15:45	juvenile	unk	travel		travel	1	325	vibratory	<5
3/17	STSL	15:47	adult	unk	resting		resting	3	504	vibratory	<5
3/17	STSL	15:55	unk	unk	resting		resting	1	267	vibratory	<5
3/17	STSL	16:11	adult	F	travel		travel	1	252	vibratory	<5
3/17	STSL	9:41	unk	unk	travel		travel	3	119	dhd	<5
3/17	STSL	9:43	adult	M	travel		travel	1	254	dhd	<5
3/17	STSL	9:57	adult	M	vessel interaction		vessel interaction	1	94	dhd	<5
3/17	STSL	10:09	adult	M	travel		travel	1	231	dhd	<5
3/17	STSL	10:14	adult	M	travel		travel	1	203	dhd	<5
3/17	STSL	15:51	adult	F	travel		travel	2	206.6	vibratory	<5
3/17	STSL	15:54	adult	M	travel		travel	1	250	vibratory	<5
3/17	STSL	15:51	adult	unk	travel		travel	2	162	vibratory	<5
3/17	STSL	17:07	adult	F	travel		travel	1	301	impact	<5
3/17	STSL	17:01	adult	F	travel		travel	1	344	impact	<5
3/18	KIWH	9:23	adult	unk	travel	10:16	mill	3	633	dhd	329
3/18	STSL	13:27	juvenile	M	unk		dive;travel;unknown	1	154	dhd	11
3/18	STSL	14:48	adult	M	mill		mill;travel	3	159	dhd	40
3/18	STSL	16:59	juvenile	unk	travel		travel	3	116	dhd	<5
3/18	STSL	17:08	unk	unk	travel		travel	2	299	dhd	<5
3/18	STSL	17:14	adult	M	vessel interaction		vessel interaction	1	129.5	dhd	<5
3/18	STSL	17:41	adult	F	fleeing		fleeing	2	290	dhd	<5
3/18	STSL	18:27	juvenile	unk	fleeing		fleeing	1	264	dhd	<5
3/18	STSL	17:58	juvenile	unk	travel	18:28	fleeing	1	249	dhd	<5
3/18	STSL	8:12	adult	unk	vessel interaction	11:17	resting;vessel interaction	3	63	vibratory	12
3/18	STSL	11:16	adult	M	travel		travel	1	376	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/18	STSL	11:29	adult	M	travel		mill;travel	3	49	vibratory	9
3/18	STSL	15:16	adult	M	mill		mill	1	139	dhd	<5
3/18	STSL	15:25	adult/subadult	F	travel		travel	2	166	dhd	<5
3/18	STSL	15:48	adult	M	travel		travel	1	148.7	dhd	<5
3/18	STSL	17:53	adult	M	alert	18:26	mill	1	239	dhd	<5
3/18	STSL	18:18	adult	M	travel	18:25	mill	1	223	dhd	<5
3/18	STSL	18:33	adult	F	alert		alert	2	294	dhd	<5
3/18	STSL	18:40	unk	unk	travel		travel	1	249	dhd	<5
3/18	STSL	18:54	adult	F	dive		dive	1	232	dhd	<5
3/18	STSL	18:59	adult/subadult	unk	travel		travel	5	214	dhd	<5
3/18	STSL	10:15	adult	unk	alert		alert	6	516	vibratory	<5
3/18	STSL	15:13	juvenile	M	mill		mill;travel	1	145	dhd	16
3/18	STSL	16:30	adult	M	mill		mill	1	250	dhd	<5
3/18	STSL	16:35	adult	M	travel		travel	1	272	dhd	6
3/19	STSL	8:46	juvenile	unk	travel		travel	5	234	vibratory	7
3/19	STSL	8:55	juvenile	unk	travel		travel	3	136	vibratory	7
3/19	STSL	9:14	juvenile	unk	travel		travel	1	162	vibratory	<5
3/19	STSL	9:26	juvenile	unk	travel		travel	3	253	vibratory	<5
3/19	STSL	13:30	juvenile	unk	travel		travel	1	281	vibratory	<5
3/19	STSL	13:30	juvenile	unk	travel		travel	2	381	vibratory	<5
3/19	STSL	13:34	juvenile	M	travel		travel	1	363	vibratory	<5
3/19	STSL	9:19	unk	unk	unknown		unknown	2	395	vibratory	<5
3/19	STSL	10:07	adult	F	travel		travel	1	346	impact	<5
3/19	STSL	10:09	adult	F	travel		travel	1	281	impact	<5
3/19	STSL	12:21	adult	unk	travel		travel	2	272	vibratory	<5
3/19	STSL	12:45	adult/calves	unk	travel		travel	6	106	vibratory	<5
3/19	STSL	13:03	adult	M	travel		resting;travel	2	168	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/19	STSL	13:21	adult	M	travel		travel	1	176	vibratory	5
3/19	STSL	8:43	juvenile	unk	travel		travel	2	293	vibratory	<5
3/19	STSL	8:47	adult/subadult	unk	alert		alert	3	359	vibratory	<5
3/21	STSL	9:21	adult	M	feeding		feeding	1	294	dhd	<5
3/21	STSL	11:00	adult	M	travel		travel	1	215	dhd	<5
3/21	STSL	11:05	adult	M	travel		travel	1	267	dhd	<5
3/21	STSL	11:05	adult/subadult	M	travel		travel	3	72	dhd	<5
3/21	STSL	15:19	adult	M	travel		feeding;travel	1	130	vibratory	<5
3/21	STSL	15:38	juvenile	M	travel		travel	1	296	vibratory	<5
3/21	STSL	15:56	adult	M	on_land		on_land	1	282	impact	<5
3/21	STSL	16:00	juvenile	unk	travel		travel	1	347	impact	<5
3/21	STSL	13:37	adult/subadult	F	travel		travel	3	285	dhd	<5
3/21	STSL	13:56	adult	M	travel		travel	1	253	dhd	<5
3/21	STSL	15:03	adult	M	travel		travel	1	298	vibratory	<5
3/21	STSL	15:04	adult	M	travel		travel	1	453	vibratory	<5
3/21	STSL	9:05	juvenile	M	travel		travel	1	239	dhd	<5
3/21	STSL	9:07	adult	F	travel		travel	1	219	dhd	8
3/21	STSL	9:16	adult	M	mill		mill	1	119	dhd	<5
3/21	STSL	12:42	adult	M	travel		travel	1	103	dhd	<5
3/21	STSL	14:18	adult	F	travel		travel	3	117	dhd	<5
3/21	STSL	15:00	adult	M	vessel interaction		vessel interaction	2	157	vibratory	<5
3/21	STSL	15:20	adult		travel		travel	3	179	vibratory	<5
3/21	STSL	15:35	adult	M	travel		travel	1	244	vibratory	<5
3/21	STSL	15:38	adult	F	travel		travel	1	235	vibratory	<5
3/22	STSL	10:36	adult	F	travel		travel	3	234.4	vibratory	<5
3/22	STSL	10:41	adult/subadult	M	mill		mill	2	114	vibratory	<5
3/22	STSL	12:15	adult	M	mill		mill	1	213	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
3/22	STSL	15:11	adult	M	travel		travel	1	351.3	vibratory	<5
3/22	STSL	15:17	adult	M	travel		travel	3	421	vibratory	<5
3/22	STSL	10:36	adult	M	travel		travel	1	361	vibratory	<5
3/22	STSL	12:01	adult	M	travel		travel	1	257	dhd	8
3/22	STSL	12:30	adult	M	vessel interaction		vessel interaction	1	73.9	dhd	<5
3/22	STSL	10:33	adult	unk	mill		mill	5	311	vibratory	<5
3/30	STSL	16:36	adult/subadult	unk	travel		travel	6	227	dhd	<5
3/30	STSL	16:48	adult	unk	mill		mill	1	314.9	vibratory	39
3/30	STSL	17:22	adult/subadult	M	mill		mill	2	291	vibratory	<5
3/30	STSL	16:27	adult	unk	mill		mill	3	281	dhd	<5
3/30	STSL	16:29	adult	M	travel		travel	1	205	dhd	<5
3/30	STSL	16:36	adult	M	travel		travel	1	105	dhd	<5
3/31	STSL	8:48	adult/subadult	M	travel		travel	3	243	vibratory	<5
3/31	STSL	11:54	adult	M	travel		travel	1	171	vibratory	<5
3/31	STSL	15:19	adult	M	mill		mill	2	341	vibratory	<5
3/31	STSL	15:45	adult	unk	mill		mill	1	289	vibratory	<5
3/31	STSL	8:34	adult	M	mill		mill	1	181	vibratory	<5
3/31	STSL	11:52	adult	M	mill		mill	1	405	vibratory	<5
3/31	STSL	16:39	adult	M	dive		dive	1	112	vibratory	<5
4/1	STSL	8:11	juvenile	M	travel		travel	1	122	vibratory	<5
4/1	STSL	11:06	adult	M	mill		mill;travel	4	277	dhd	74
4/1	STSL	11:58	juvenile	M	dive		dive	1	297.4	dhd	<5
4/1	STSL	12:06	adult	F	travel		travel	1	239	dhd	<5
4/1	STSL	12:38	juvenile	M	feeding		feeding	1	209	dhd	<5
4/1	STSL	10:25	adult	F	travel		travel	6	111	dhd	<5
4/1	STSL	13:00	adult	M	mill		mill	1	141	dhd	<5
4/1	STSL	8:15	adult	M	travel		travel	1	328	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
4/1	STSL	8:17	adult	F	travel		travel	1	357	vibratory	<5
4/1	STSL	10:14	adult	unk	travel		travel	6	256	dhd	6
4/1	STSL	10:21	adult	M	travel		travel	1	155	dhd	<5
4/1	STSL	13:52	adult	M	mill		mill	1	282	vibratory	<5
4/12	STSL	10:56	adult	F	travel		travel	1	398.3	vibratory	<5
4/12	STSL	16:49	juvenile	F	travel		travel	1	184	vibratory	<5
4/13	STSL	9:09	juvenile	unk	travel		travel	3	271	dhd	<5
4/13	STSL	9:18	juvenile	unk	travel		travel	1	291	dhd	<5
4/13	STSL	10:05	adult	M	travel	10:10	travel	1	177	dhd	<5
4/13	STSL	11:31	adult	M	travel		travel	1	204	dhd	<5
4/13	STSL	11:59	adult	M	travel		travel	1	121	dhd	<5
4/13	STSL	11:59	adult	F	travel		travel	2	114	dhd	<5
4/13	STSL	9:07	adult	F	travel		travel	1	235.6	dhd	<5
4/13	STSL	10:24	adult	F	travel		travel	1	274	dhd	<5
4/13	STSL	10:25	adult	M	travel		travel	1	285.7	dhd	<5
4/13	STSL	11:39	adult	M	travel		travel	2	289	dhd	<5
4/13	STSL	13:25	adult	F	travel		travel	1	271	vibratory	<5
4/13	STSL	16:52	adult	M	travel		travel	1	457	vibratory	<5
4/13	STSL	16:55	adult	M	travel		travel	1	564	vibratory	<5
4/13	STSL	10:15	unk	M	dive		dive	1	255	dhd	<5
4/13	STSL	10:43	unk	M	travel		travel	1	157	dhd	<5
4/13	STSL	13:30	unk	unk	travel		travel	1	345	vibratory	<5
4/14	STSL	9:19	adult	unk	travel		travel	2	193	dhd	<5
4/14	STSL	9:23	adult	M	travel		travel	1	277	dhd	<5
4/14	STSL	9:29	adult	M	travel		travel	1	288	dhd	<5
4/14	STSL	9:32	juvenile	M	travel		travel	1	264	dhd	<5
4/14	STSL	9:51	adult	M	feeding		feeding	2	126	dhd	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
4/14	STSL	11:14	adult	M	travel		travel	1	140	dhd	<5
4/14	STSL	12:18	adult	unk	travel		travel	1	122	dhd	<5
4/14	STSL	12:20	adult	F	mill		mill	1	83	dhd	<5
4/14	STSL	12:53	adult	M	fight		fight	2	156	dhd	<5
4/14	STSL	12:54	juvenile	unk	travel		travel	1	109	dhd	<5
4/14	STSL	14:35	juvenile	unk	alert		alert	1	337.9	impact	<5
4/14	STSL	14:41	juvenile	unk	travel		travel	2	298	impact	<5
4/14	STSL	14:45	adult	M	feeding		feeding	1	327	impact	<5
4/14	STSL	16:08	juvenile	unk	travel		travel	1	105	vibratory	<5
4/14	STSL	9:24	adult	M	travel		travel	1	175	dhd	<5
4/14	STSL	9:35	adult	M	travel		travel	1	245	dhd	<5
4/14	STSL	9:43	adult	F	travel		travel	1	217	dhd	<5
4/14	STSL	9:53	adult	unk	travel		travel	3	173	dhd	<5
4/14	STSL	10:39	adult	F	travel		travel	1	137	dhd	<5
4/14	STSL	11:08	juvenile	M	travel		travel	1	237	dhd	<5
4/14	STSL	12:22	adult	M	travel		travel	1	281	dhd	5
4/14	STSL	12:32	adult	F	travel		travel	1	291	dhd	<5
4/14	STSL	12:44	adult	unk	travel		travel	4	223	dhd	<5
4/14	STSL	12:39	adult	M	vessel interaction		vessel interaction	1	286	dhd	<5
4/14	STSL	12:48	adult	M	travel		travel	1	240	dhd	<5
4/14	STSL	13:55	adult	M	travel		travel	1	319	vibratory	<5
4/14	STSL	14:03	adult	M	travel		travel	2	238	vibratory	128
4/14	STSL	16:15	adult	unk	travel		travel	2	175	vibratory	<5
4/14	STSL	10:41	adult	M	feeding		feeding;travel	1	106	dhd	12
4/14	STSL	10:43	juvenile	M	mill		mill	1	253	dhd	<5
4/14	STSL	11:45	adult	M	travel		travel	1	231.5	dhd	<5
4/14	STSL	14:02	adult	M	mill		mill	1	255	vibratory	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
4/14	STSL	14:29	adult	M	travel	14:37	mill	1	195	impact	<5
4/14	STSL	14:56	adult	M	mill		mill	2	146	impact	<5
4/15	STSL	10:10	adult	M	travel		travel	1	387	vibratory	<5
4/15	STSL	10:11	juvenile	unk	travel		travel	1	330	vibratory	<5
4/15	STSL	10:12	adult	F	travel		travel	1	306	vibratory	<5
4/15	STSL	10:16	unk	unk	travel		travel	1	250	vibratory	<5
4/15	STSL	13:16	unk	unk	travel		feeding	1	310	vibratory	<5
4/15	STSL	13:38	adult	M	travel		travel	1	116	vibratory	<5
4/15	STSL	13:24	adult/calves	unk	travel		travel	3	219	vibratory	<5
4/15	STSL	9:56	juvenile	unk	travel	10:01	travel	1	155	vibratory	<5
4/15	STSL	10:04	juvenile	unk	travel		travel	1	257	vibratory	<5
4/15	STSL	10:06	adult	M	travel		travel	1	307	vibratory	<5
4/15	STSL	13:22	adult	unk	travel		travel	1	295	vibratory	<5
4/15	STSL	15:08	adult	F	travel		travel	1	207	dhd	<5
4/15	STSL	15:14	adult	M	travel		travel	1	129	dhd	<5
4/15	STSL	15:54	adult	M	travel		travel	1	213	dhd	<5
4/15	STSL	15:56	adult	unk	travel		travel	3	238	dhd	<5
4/15	STSL	15:41	adult	F	travel		travel	1	267	dhd	<5
4/15	STSL	13:40	adult	M	travel		travel	1	385	vibratory	<5
4/15	STSL	15:09	adult	M	travel		travel	1	274	dhd	<5
4/15	STSL	17:14	unk	M	travel		travel	1	295	dhd	<5
4/15	STSL	17:17	adult	M	travel		travel	1	254	dhd	<5
4/16	STSL	9:32	adult	M	travel		travel	4	108	dhd	5
4/16	STSL	9:44	adult	M	travel		mill;travel	1	247	dhd	10
4/16	STSL	12:59	adult	unk	travel		travel	1	121.1	vibratory	<5
4/16	STSL	13:12	adult	M	travel		travel	1	215	impact	<5
4/16	STSL	16:23	juvenile	M	travel		travel	1	312	vibratory	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
4/16	STSL	10:51	adult	M	travel		travel	1	197	dhd	<5
4/16	STSL	11:48	adult	M	travel		travel	3	305	vibratory	<5
4/16	STSL	11:51	adult	M	travel		travel	1	69	vibratory	<5
4/16	STSL	13:25	adult	M	travel		travel	1	247	impact	<5
4/16	STSL	9:17	adult	M	travel	9:28	travel;unknown	4	142	dhd	<5
4/16	STSL	9:34	juvenile	M	mill		mill	1	141	dhd	<5
4/16	STSL	9:54	unk	M	mill		mill	1	110	dhd	<5
4/16	STSL	9:57	juvenile	M	travel		travel	1	133.7	dhd	<5
4/16	STSL	11:56	adult	M	travel		travel	1	270	vibratory	<5
4/16	STSL	12:02	juvenile	unk	travel		travel	5	329	vibratory	<5
4/16	STSL	15:54	adult	M	unknown		unknown	1	158	vibratory	<5
4/16	STSL	16:06	adult	M	mill		mill	1	171	vibratory	<5
4/18	STSL	9:38	unk	unk	travel		travel	1	173	dhd	<5
4/18	STSL	10:50	adult	M	travel		travel	1	108	dhd	<5
4/18	STSL	10:53	juvenile	unk	travel		mill;travel	1	120	dhd	6
4/18	STSL	11:00	adult	M	travel		mill;travel	1	95	dhd	14
4/18	STSL	11:26	adult	M	travel		travel	1	119	dhd	7
4/18	STSL	8:27	unk	unk	travel		travel	1	214	dhd	<5
4/18	STSL	8:39	adult	M	travel		travel	1	289	dhd	<5
4/18	STSL	8:41	juvenile	M	travel		travel	1	267	dhd	<5
4/18	STSL	8:46	adult	M	travel		travel	1	287	dhd	<5
4/18	STSL	9:11	juvenile	M	travel		travel	1	236	dhd	<5
4/18	STSL	9:32	juvenile	unk	travel		travel	1	299	dhd	<5
4/18	STSL	12:11	adult	M	travel		travel	1	158	dhd	8
4/18	STSL	12:21	adult	M	travel		travel	1	90.1	dhd	<5
4/18	STSL	12:25	adult/calves	unk	travel		travel	2	144	dhd	<5
4/18	STSL	13:09	juvenile	unk	dive	13:20	dive	1	215	dhd	<5

## Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
4/18	STSL	15:18	juvenile	F	travel		travel	1	310	impact	<5
4/18	STSL	8:40	adult	M	travel		travel	1	134	dhd	<5
4/18	STSL	8:47	adult	M	mill		mill;travel	3	136	dhd	7
4/18	STSL	9:10	adult/subadult	unk	travel		travel	6	180	dhd	<5
4/18	STSL	9:20	adult	M	mill		mill	1	206	dhd	<5
4/18	STSL	9:26	juvenile	unk	travel		travel	1	135	dhd	<5
4/18	STSL	9:27	unk	unk	travel		travel	1	207	dhd	<5
4/18	STSL	10:52	adult	M	travel		mill;travel	1	72	dhd	173
4/18	STSL	14:00	adult	F	travel		travel	1	158	dhd	<5
5/24	KIWH	16:44	adult/calves	unk	mill	17:14	travel	7	114	vibratory	<5
5/25	HASE	11:20	adult	unk	dive	11:25	travel	1	357.2	vibratory	<5
5/25	STSL	10:27	adult	M	travel	10:36	unknown	2	323	vibratory	<5
5/25	STSL	10:34	adult	M	mill		mill	1	398	vibratory	<5
5/25	STSL	11:13	juvenile	M	travel		travel	2	201	vibratory	<5
5/25	STSL	11:41	juvenile	F	travel		travel	1	143	vibratory	<5
5/25	STSL	10:15	juvenile	M	mill		mill	1	181	vibratory	<5
5/25	STSL	11:10	adult/calves	unk	travel		travel	6	192	vibratory	<5
6/14	STSL	8:32	adult/subadult	unk	travel		travel	3	240	vibratory	<5
6/14	STSL	8:34	juvenile	unk	travel		travel	1	274	vibratory	<5
6/15	STSL	11:18	adult/calves	unk	travel		travel	4	276.7	vibratory	<5
6/15	STSL	13:37	juvenile	unk	travel		travel	1	150.6	vibratory	<5
6/15	STSL	14:05	juvenile	unk	travel		travel;unknown	2	80	impact	<5
6/15	STSL	9:49	juvenile	unk	travel		travel	1	302	vibratory	<5
6/15	STSL	9:56	adult	M	travel		travel	1	326	vibratory	7
6/15	STSL	10:02	juvenile	unk	travel		travel	2	242	vibratory	<5
6/15	STSL	11:13	adult	F	travel	11:16	travel	1	368	vibratory	<5
6/15	STSL	13:44	juvenile	unk	dive		dive	1	611	vibratory	<5

Appendix I. Continued.

date	Species	Initial obs. time	age	sex	Initial behavior	Time entered disturbance zone <sup>a</sup>	Disturbance zone behaviors	Group size	Closest distance to construction (m)	Construction activity	Duration (Min)
6/15	STSL	14:10	adult	M	travel		travel	1	310	impact	<5

<sup>a</sup>. time of disturbance zone entry shown only if different from initial observation time.

Appendix J. Sample paper data sheets used during the Kodiak Ferry Terminal and Dock Improvement Project, November 2015–June 2016.





